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DEPARTMENT OF THE INTERIOR
IRRIGATION BRANCH

REPORT OF THE PROCEEDINGS OF THE EIGHTH ANNUAL CONVENTION OF THE WESTERN CANADA IRRIGATION ASSOCIATION

HELD AT

PENTICTON, B. C.

August 17, 18 and 19, 1914

Published by the authority of the Hon. W. J. Roche
Minister of the Interior

OTTAWA
GOVERNMENT PRINTING BUREAU
1915

Irrigation Intake Dam, Penticton Creek, B.C.

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PREVIOUS CONVENTIONS.

Calgary, Alberta, 1907.

Vernon, British Columbia, 1908.

Lethbridge, Alberta, 1909.

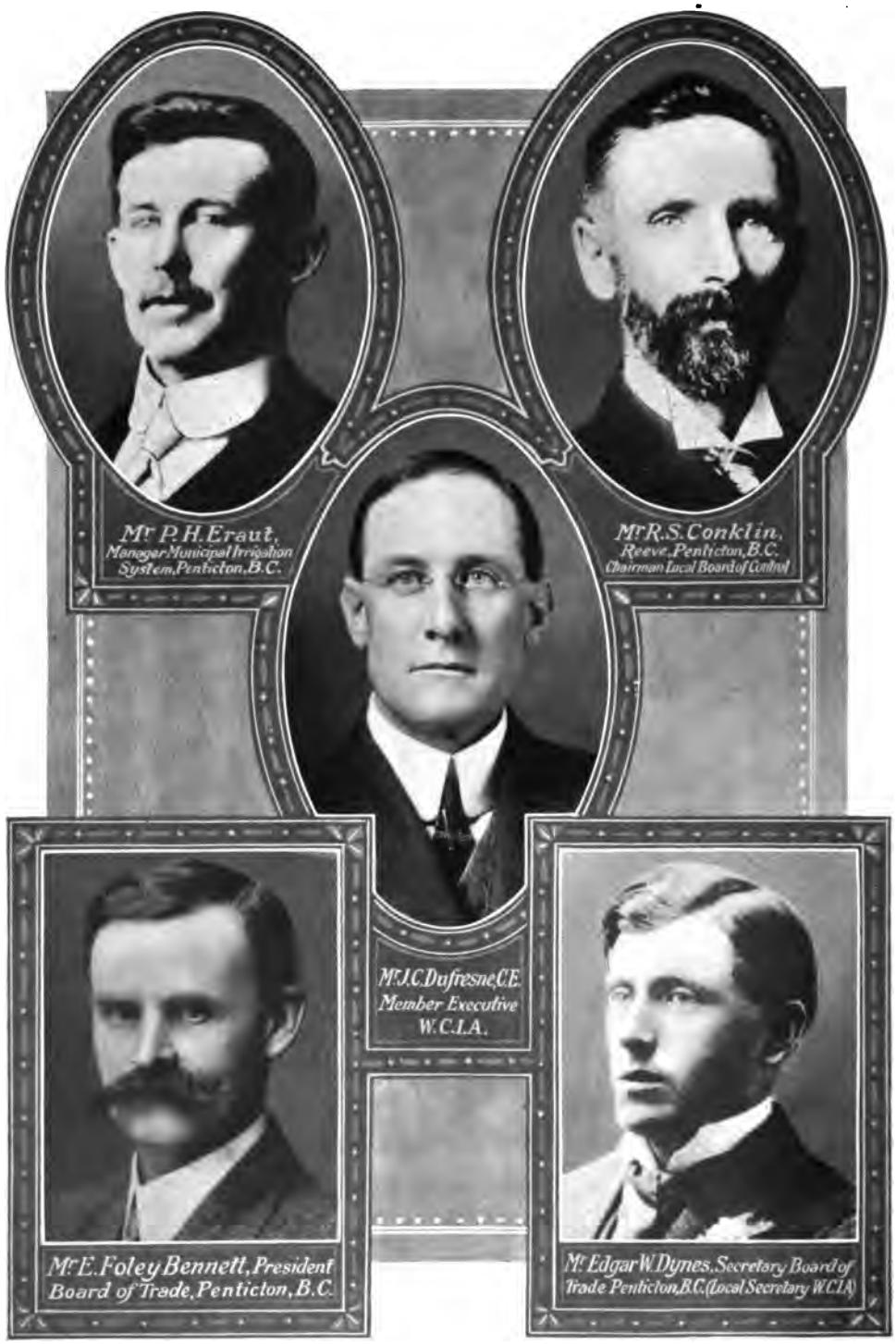
Kamloops, British Columbia, 1910.

Calgary, Alberta, 1911.

Kelowna, British Columbia, 1912.

Lethbridge, Alberta, 1913.

Honourable Dr. W. J. Roche, Minister of the Interior, Honorary President Western Canada Irrigation Association.


Mr P. H. Eraut,
Manager Municipal Irrigation
System, Penticton, B.C.
Mr R. S. Conklin,
Reeve, Penticton, B.C.
Chairman Local Board of Control
Mr J. C. Dufresne, C.E.
Member Executive
W. C. I. A.
Mr E. Foley Bennett, President
Board of Trade, Penticton, B.C.
Mr Edgar W. Dynes, Secretary Board of
Trade Penticton, B.C. (Local Secretary W.C.I.A.)

OFFICERS FOR THE YEAR 1913-14.

Honorary President—The Honourable W. J. ROCHE, Minister of the Interior, Ottawa.

President—Honourable W. R. Ross, Minister of Lands, B.C.

First Vice-President and Chairman of the Executive Committee—J. S. DENNIS, Assistant to the President C.P.R., Calgary, Alberta.

Second Vice-President—W. H. FAIRFIELD, Superintendent Dominion Experimental Farm, Lethbridge, Alberta.

EXECUTIVE COMMITTEE.

C. W. DICKSON, vice I. W. WOOLSEY resigned, Kelowna, B.C.

E. FOLEY-BENNETT, Penticton, B.C.

J. C. DUFRESNE, Penticton, B.C.

F. J. FULTON, Kamloops, B.C.

WM. PEARCE, Calgary, Alberta.

F. H. PETERS, Calgary, Alberta.

D. W. HAYS, Medicine Hat, Alberta.

W. X. WRIGHT, Battle Creek, Saskatchewan.

Permanent Secretary—NORMAN S. RANKIN, Calgary, Alberta.

LOCAL BOARD OF CONTROL.

Chairman—R. S. CONKLIN, Reeve of Penticton.

Secretary—EDGAR W. DYNES, Secretary Penticton Board of Trade.

Treasurer—J. H. McCOY, Manager Bank of Hamilton.

Official Reporter—H. J. RUSSELL.

PROMPTNESS.

The essence of success in all meetings, excursions and lectures is *promptness*, and as the time is limited it is the desire of the executives that every delegate make the best of it.

RULES.

Rules governing the conduct of the convention will be read by the secretary from the constitution prior to the opening address. Strict compliance with these will expedite business.

SPEAKERS.

FRANK ADAMS, in charge of Irrigation Investigations, University of California—"An Illustrated Talk on the Orchards Irrigation Methods of California."

Dr. J. G. RUTHERFORD, Supt. Agriculture and Animal Industry Branch, C.P.R.—"Interdependence of Farm and City."

DON. H. BARK, in charge of Investigations, Boise, Idaho—"The Actual Problem that Confronts the Irrigator."

Prof. W. J. ELLIOTT, Principal Provincial Agricultural Schools, Olds, Alberta—"Educating the Farmer's Boy and Girl."

J. W. EASTHAM, Provincial Pathologist, British Columbia Government —"Moisture Conditions in Relation to Plant Diseases."

C. L. SMITH, Agriculturist, O. W. R. & N. Railroad, Portland—"Live Stock and Mixed Farming."

WM. YOUNG, Comptroller of Water Rights, British Columbia Government —"Water Administration in British Columbia."

H. C. MCMULLEN, late General Live Stock Agent, C.P.R.—"Live Stock on an Irrigated Farm."

ARTHUR HOOKER, Secretary, International Irrigation Congress, Calgary—"The Work of the International Congress."

G. N. HOUSTON, Department of the Interior, Irrigation Branch, Calgary—"The Storage of Water for Irrigation."

C. E. WHISTLER, Managing Editor, Fruit and Produce Distributor, Portland —"The Care and Culture of Apples and Other Fruits." (Cultivation, insect pests, smudging, harvesting, packing, shipping, etc.)

H. W. GRUNSKY, Water Rights Branch, British Columbia Government—"Features of the British Columbia Water Act."

Major RICHARD W. YOUNG, President International Irrigation Congress.

Dr. FRANK T. SHUTT, Dominion Chemist, Central Experimental Farm, Ottawa, Ont.

S. G. PORTER, Dept. of the Interior, Calgary, Alberta—"The Practical Operation of Irrigation Works."

NOTES.

CONVENTION HEADQUARTERS.

Meetings will be held in Steward's Hall, Main Street, midway between the Bank of Montreal and the Bank of Commerce.

SECRETARY'S OFFICE.

The permanent secretary's headquarters are in the Board Room, Incola hotel

REGISTRATION.

Delegates are requested to register with the permanent secretary or his assistant on arrival and at Steward's Hall during convention hours.

RAILWAY CERTIFICATES.

Holders of standard railway certificates will present them to the secretary or his assistant at his office in the Incola hotel or at Steward's Hall during convention hours.

BADGES.

The secretary will issue a badge to each delegate upon registering, and it should be worn conspicuously during the convention to enable the chairman to recognize properly accredited delegates. An additional badge of a distinguishing colour will also be worn by each executive.

ADMISSION.

There will be no charge for admission to any session of the convention and the public are cordially invited to attend. Fruit growers and farmers are especially invited to all sessions and to participate in the discussions.

PRIVILEGES.

Upon registration a special invitation will be extended to all delegates to accept the privileges of the Aquatic Club of Penticton during their stay. The club have a fine club-house on the lake shore, and every delegate is requested to make use of the privilege offered.

OFFICIAL PROGRAMME.

MONDAY, AUGUST 17.

8.30 a.m.—Music by the Penticton Brass Band. Band will play first in front of Incola hotel, later, marching up street, and playing in front of the Convention Hall.

9.20—Music by Emmerton's orchestra.

OPENING SESSION 9.30 a.m.

9.30—The delegates will assemble in Steward's Hall for the opening session The delegates will rise, and led by the orchestra, will join in singing "God Save the King."

The Honourable W. R. Ross, President of the Association, will call the meeting to order, and declare the Eight Annual Convention formally opened.

Invocation—Rev. J. A. Cleland, pastor of St. Saviour's Anglican Church.

9.45—Welcome to the province: Hon. Richard McBride, Premier British Columbia, or representative.

10.00—Address of Welcome: His Worship Reeve Conklin.

10.15—Address of Welcome: E. Foley-Bennett, President Board of Trade.

10.30—President's Report: Hon. W. R. Ross, Minister of Lands.

10.45—Secretary's Report: Norman S. Rankin.

11.00—Music. Emmerton's orchestra.

11.05—Address: E. F. Drake, Supt. of Irrigation, Dominion Government, Ottawa.

11.20—Hon. Geo. Harcourt, Deputy Minister of Agriculture, Alberta.

11.45—Address: Hon. Price Ellison, Minister of Finance and Agriculture.

12.00—Address: Dr. Frank T. Shutt, Dominion Chemist, Central Experimental Farm, Ottawa.

12.15—Appointment committee on credentials and resolutions.

Adjournment.

AFTERNOON SESSION.

2.00 — Address: S. G. Porter, Department. Interior, Calgary, Alberta.—"The Practical Operation of Irrigation Works."

2.40—Discussion.

3.00—Prof. W. J. Elliott, Principal Provincial Agricultural School, Olds, Alberta.—"Educating the Farmer's Boy and Girl." Discussion.

3.45—Don. H. Bark, in charge of Investigations, Boise, Idaho.—"The actual problem that Confronts the Irrigator." Discussion.

EVENING.

8.00—Dr. J. G. Rutherford, Superintendent Agriculture and Animal Husbandry, C.P.R.—"Interdependence of Farm and City." Discussion.

9.00—Frank Adams, in charge Irrigation Investigations, University of California. —"An Illustrated Talk on the Orchard Irrigation Methods of California."

TUESDAY, AUGUST 18.

MORNING SESSION.

9.30—J. W. Eastham, Provincial Pathologist, British Columbia Government.— "Moisture Conditions in Relation to Plant Diseases." Discussion.

10.15—C. L. Smith, Agriculturist, O.W.R. & N. Railroad, Portland, Oregon.— "Live Stock and Mixed Farming." Discussion.

11.00—William Young, Comptroller of Water Rights, British Columbia Government.—"Water Administration in British Columbia." Discussion.

12.00—Report of the committee on credentials. Report of the committee on resolutions (preliminary).

AFTERNOON.

There will be no session in the afternoon on account of the regatta of the Penticton Aquatic Club. The regatta is being specially held on this date for the entertainment of the delegates. Penticton Brass Band will be in attendance. Delegates are invited to view the regatta from the club-house and requested to please show their badges.

In the evening the orchestra will be in attendance at the club-house from 9 p.m. Prizes won in the afternoon will be presented to the winners.

EVENING SESSION.

8.00—H. C. McMullen, late General Live Stock Agent, C.P.R., Alberta.—"Live Stock on an Irrigated Farm."

8.45—Arthur Hooker, Secretary International Irrigation Congress, Calgary.—"The Work of the International Congress."

9.00—G. N. Houston, Department Interior, Irrigation Branch, Calgary.—"The Storage of Water for Irrigation."

WEDNESDAY, AUGUST 19.

8.00 a.m.—Through the kindness and courtesy of the Kettle Valley Railway Company, Mr. James J. Warren, President, an excursion train will leave Penticton station at 8 a.m. sharp, and will make the 20 mile run to the Big Tunnel on the east side, and return, arriving back at Penticton at 10.45 a.m. Every delegate is urged to be on hand to catch this train as it must leave on time, in order not to interfere with the programme for the day.

Leaving the station we proceed through the town of Penticton, reaching the main line of the Kettle Valley about 1 mile from the station. To the right may be noticed the Penticton recreation grounds, the grand stand and the horticultural buildings. On these grounds the Penticton Turf Club have developed one of the best race tracks in the Okanagan Valley.

Soon after reaching the main line, we pass the new municipal power-house on the right, where the Mirrless oil engine supplies the power for the town's electric plant, and is working very satisfactorily. After crossing Penticton creek the railway skirts the bench residential section, where some fine residences have been erected. After crossing Vancouver avenue, and leaving the town well behind, we notice the Kettle Valley farm on the right, where a fine herd of thoroughbred Holsteins are to be seen. From this point the railway skirts along the steep clay cliffs which rise above the lake, and about 3 miles out the railway swings in toward the mountain, crossing through some of Penticton's finest orchards, although the largest area of compact orchards will be seen on the motor drive in the afternoon. Here and there will be noticed iron pipes passing in under the railway track. This is a part of the Penticton municipal irrigation system.

As we pass along the railway creeps higher and higher up, the gradual rise in the grade reminding one somewhat of the climb from Robson to Shields on the Columbia and Western, with this difference, that instead of the lake mountain sid you view a panorama of lake, towns, mountains, orchards, and homes. When we cross Mill creek about 9 miles from Penticton, below us lies the picturesque little town of Naramata. Across the lake are the towns of Summerland and West Summerland.

Leaving Mill creek behind we come to the loop. Enclosed in the curve of the loop is a beautiful natural park owned by the railway, which they propose

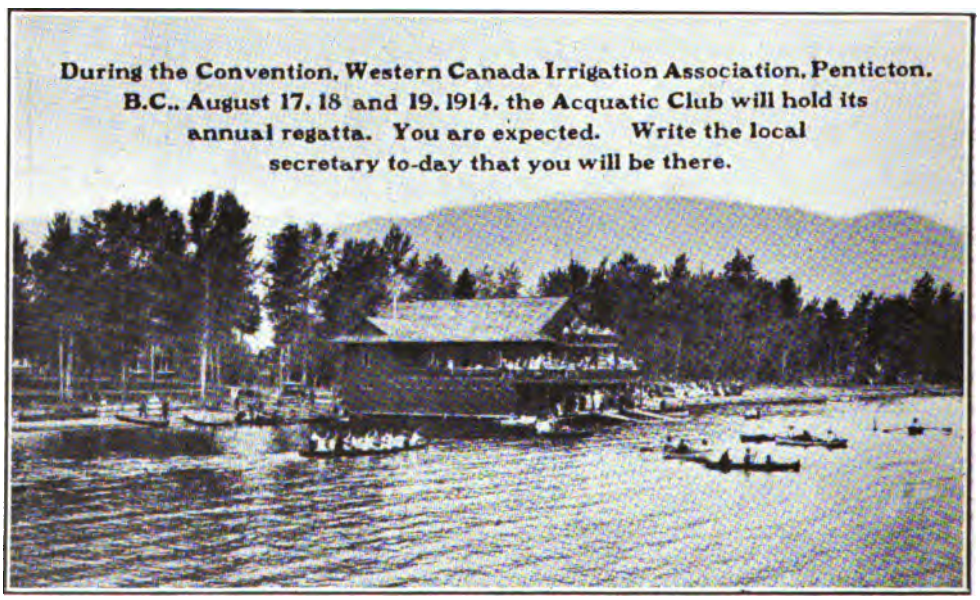
Mr Arthur Hooker, Secretary
International Irrigation Congress
Mr Norman S. Rankin,
Permanent Secretary, W.C.I.A.
Mr W.H. Fairfield,
Superintendent Dominion
Experimental Farm,
Lethbridge, Alta
Vice President W.C.I.A.
Mr Wm. Pearce, Calgary, Alta
Chairman Executive Committee, W.C.I.A
Mr D. W. Hays, Medicine Hat, Alta,
Member Executive W.C.I.A.

to reserve for that purpose. It is likely to be a popular resort for picnic parties. After passing around the loop we climb the last grade before reaching the Big Tunnel, where the stop is made. A few hundred feet above we see the track again, this portion being on the other side of the tunnel. To our right as we near the tunnel may be seen the telephone line of the Forest Service, which is doing such good work under the supervision of the Minister of Lands, Hon. W. R. Ross. This line is used to give the alarm in case of a forest fire. We understand that arrangements are being made to have a telephone line run along the whole summit between the Kettle Valley and the Okanagan.

The tunnel, where we stop, is upwards of 1,650 feet long and is the longest tunnel on the Kettle Valley line. Returning, we obtain a splendid view of the town of Penticton, and on a clear day Skaha lake and the fruit lands of Kaleden may be seen very clearly. On each side the mountains rise to an altitude of upwards of three thousand feet, while the summits farther back are much higher. The whole scene suggests a vast natural amphitheatre with a swimming pond in the pit.

On the return trip the train is scheduled to arrive at Penticton station at 10.45. am.

11.00 a.m.—A run is now to be made to West Summerland.


During the Convention, Western Canada Irrigation Association, Penticton, B.C., August 17, 18 and 19, 1914, the Acquatic Club will hold its annual regatta. You are expected. Write the local secretary to-day that you will be there.

One of the Post Cards used to advertise the Convention.

We proceed by the same route as before to the main line, and then westward through the Indian reserve. At this point the delegates are invited to casually consider the obstacle to the development of the district which is being encountered through the fact that a small band of Indians own a very large tract of splendid land, much of which they never use except for grazing, and which, if water were

applied, would rival the best fruit districts of the Okanagan. Exact figures are not to hand, but we understand that less than two hundred adult Indians are in possession of almost fifty thousand acres of land, about a quarter of which is good fruit land.

Just before we reach Trout creek we pass the point selected for the proposed Dominion Government Experimental Station.

We now cross the Trout creek bridge, upwards of two hundred and fifty feet high, and one of the most expensive railway bridges in the province. After crossing the bridge we come into the municipality of Summerland. About a mile farther on is the site of the Summerland station, the buildings not being commenced as yet.

At this point the delegates will be met by representatives of the Summerland Board of Trade and other prominent citizens and fruit growers of the district. After sampling the fruits raised in the district, the train will proceed to Prairie Valley reservoir, in which a portion of the water used for the municipality is stored. On the way a short stop will be made at a point on the line from which an excellent bird's eye view of about 2,500 acres of orchards in all stages of development is obtained. The majority of these orchards have just sufficient slope to allow that perfect irrigation which is one of the chief factors in raising that delicious fruit which is bringing the Okanagan valley more fame every year.

From this point on to the reservoir, many of the orchards already seen will be passed. Most of them are dotted with comfortable, and in some cases, luxurious homes.

As there is not time for further travel in a westerly direction there will be no opportunity to see the many acres of virgin soil, which needs but little clearing to make it ready for cultivation, and which lies to the west of the reservoir, and practically at the same elevation.

It was the wish of the Summerland Board of Trade that they might be permitted to drive the delegates through some of the orchards, but the committee found that the time available would not permit of this.

AFTERNOON SESSION.

2.00—Address, C. E. Whistler, Managing Editor—"Fruit and Produce Distributor," Portland, Oregon.

"The care and Culture of Apples and other Fruits". (Cultivation, insect pests, smudging, harvesting, packing, shipping, etc.)
Open discussion.

3.30—H. W. Grunsky, Water Rights Branch, British Columbia Government,—"Features of the British Columbia Water Act."

4.00—Final report of Committee on Resolutions.
Election of officers and selection of place of meeting for next convention.

Delegates arriving at Penticton, B.C., August, 1914.

4.45—Motor trip to orchards and down to Skaha lake.

The automobiles will line up on Main street in front of the Convention Hall, and the route taken will be as follows:

Up Main street to Eckhardt avenue, and thence out to the bench. On this run we pass some of the oldest and finest orchards in the Penticton district. A prominent horticulturist has stated that in this portion there lies the finest area of absolutely compact orchard in British Columbia. After turning to the north at the corner of lot thirty-six we pass on the right the orchard recently purchased by Mr. McNicoll, vice-president of the C.P.R., and upon which he is erecting a beautiful home. Further on we pass the orchard and summer home of Mr. J. H. Munson, of Winnipeg, who owns one of the show places of the district. Far to our right at the foot of the mountain lies the main ditch of the Penticton creek irrigation system.

Turning to the left at lot nineteen we take a cross-road which brings us back to the road running to the town along the lake shore. On this cross-road we get a splendid view of Okanagan lake, and the towns of Summerland, West Summerland, and Naramata may be seen in the distance.

Once more reaching Penticton we go up Front street to Main street, passing the plant of Western Canners, Ltd., on our right. It may be of some interest to delegates to know that Front street is part of an old railway grade made by McKenzie and Mann more than twenty years ago, when they proposed to run a railway from Penticton to Midway. It was completed to Skaha lake, when for some reason work was stopped. We again go up Main street through the business section, pass the Convention hall, and follow the same route as before to Eckhardt avenue, when we proceed south, passing the new public school on our left, and the high school on our right. The public school has eight rooms, library and assembly hall, and is fitted up with all modern appliances. It is surrounded by a playground of 4 acres, constituting one of the finest school properties in the interior of the province. We now go directly to lake Skaha, and return by way of West Main street and Main street to Huth avenue. Thence to Fairview road, Hastings street, and down to Moosejaw street, where a short stop will be made at the shops and yards of the Kettle Valley Railway. Through an agreement signed with the Kettle Valley Railway, Penticton is to be made a divisional point.

Thence up Moosejaw street, along Eckhardt avenue to Winnipeg street, down Winnipeg street to Fairview avenue, and along Fairview avenue to Main street, and back to the business section.

EVENING.

A banquet will be tendered to the speakers, foreign delegates and visitors by the Municipal Council and the Board of Trade. Reception 8.15. Banquet at 8.45 in the Incola hotel.

CONVENTION RULES.

Each morning session shall be called to order at 9.30 a.m., each afternoon session at 2 p.m., and each evening session at 8 p.m. Morning sessions shall adjourn at 12.30 p.m., unless otherwise ordered by vote of the Convention.

All sessions shall open promptly.

Any delegate or other member desiring to speak shall address the Chair, and unless called on by name shall begin by giving his name and place. Communications on subjects not entered in the programme will be limited to five minutes, unless otherwise directed by vote of the convention.

General resolutions, after reading, shall be referred to the Committee on Resolutions, without debate, and no general resolution shall be received after the opening of the convention, without unanimous consent. Special resolutions relating to the conduct of the association may be read and considered at the discretion of the presiding officer after examination by him.

The time of speakers in general discussion shall be limited to ten minutes, and the time of speakers on questions or resolutions relating to the conduct of the convention shall be limited to five minutes, unless otherwise directed by vote of the convention.

For the convenience of the convention and speakers a bell will ring once three minutes before the close and twice at the close of the time allotted to each speaker on the programme. In the course of discussion and in addresses not entered on the programme, the bell will ring once one minute before the close and twice at the close of the time allotted to the speaker under these rules.

Any speaker rising to address the convention, who is in the employ, whether by retainer or otherwise, of any public service corporation which is interested in the action or subjects of deliberation of this convention, shall mention the fact and nature of such employment before proceeding to speak.

THE WESTERN CANADA IRRIGATION ASSOCIATION.

OFFICERS FOR THE YEAR 1914-15.

Hon. President—The Honourable W. J. ROCHE, Minister of the Interior.

President—The Honourable DUNCAN MARSHALL, Minister of Agriculture for the Province of Alberta.

Vice President—DR. C. W. DICKSON, Kelowna, B.C.

Second Vice-President and Chairman Executive Committee—WILLIAM PEARCE, Calgary, Alberta.

Executive—

R. C. PEGLER, Bassano, Alberta.

F. H. PETERS, Calgary, Alberta.

W. HUCKVALE, Medicine Hat, Alberta.

W. H. FAIRFIELD, Lethbridge, Alberta.

JAMES JOHNSTON, Nelson, B.C.

WILLIAM YOUNG, Victoria, B.C.

ARTHUR CHAMBERLAIN, Kamloops, B.C.

J. C. DUFRESNE, Penticton, B.C.

Permanent Secretary—NORMAN S. RANKIN, Calgary, Altbera.

Next place of meeting—Bassano, Alberta.

Report of the Proceedings

Of the

Eighth Annual Convention

Of the

Western Canada Irrigation Association

Held at Penticton

On

August 17, 18 and 19, 1914

OPENING SESSION — Monday, August 17 — 9.30 a.m.

The eighth annual convention of the Western Canada Irrigation Association opened in Penticton, B.C., on Monday, August 17, at 9.30 a.m.

In the unavoidable absence of the President and Vice-President, the chair was taken by the Second Vice-President, Mr. W. H. Fairfield, Superintendent of the Dominion Experimental Farm, Lethbridge, Alberta.

In calling the convention to order, the chairman said: "Ladies and gentlemen, in the absence of our president, the Honourable Mr. Ross, it is my pleasant duty to declare this, the Eighth Annual Convention of the Western Canada Irrigation Association, formally open, and we will ask all to rise and join in singing, God Save the King." At the conclusion of the national anthem the chairman said: "Our programme will be prefaced by an invocation by the Rev. J. A. Cleland, Rector of St. Saviour's Anglican Church." The Rector then led the Convention in prayer.

CHAIRMAN: We are now to hear an address of welcome to the Province of British Columbia by the Hon. Price Ellison, Minister of Finance and Agriculture. It is unnecessary for me to offer anything in the way of introduction for this gentleman to a British Columbia audience, but for the benefit of delegates from the eastern sister provinces, I might say that the Hon. Price Ellison has been one of the best friends of agriculture, not only in the province, but particularly in this valley. He has been an indefatigable worker in the interests

of irrigation and, as you know, is an old timer. He has been an earnest supporter of the Western Canada Irrigation Association ever since its inaugaration. (Applause.)

Honourable Price Ellison, Minister of Finance and Agriculture, B.C. (Snapped at Pentiction).

Hon. PRICE ELLISON: Mr. President, ladies and gentlemen,—You will pardon me if I am not able to make myself heard, but I have have been suffering from a severe cold. I am delighted to be here this morning with you, and to welcome you, and tell you how much Sir Richard McBride regrets that he is not able to be with you to-day. It is very fitting indeed that he should be where he is, because if there are any submarines to be offered for sale or anything else to go to strengthen the Army or the Navy of the nation we are so proud of, he will be there to to do it. (Hear, hear.) As a member of the Cabinet, I welcome you to British Columbia, and as the representative of this district, and this particular portion of it, Penticton, I welcome you, because I know the people of Penticton do this heartily and cordially in a manner and will do before you are through—that I am unable to express, I am sure.

I wish to thank Mr. Rankin for this splendid programme, and if it is carried out you will have a splendid time I am sure. We have with us the most eminent men on irrigation, water, water rights, and the use of water, and we are truly thankful that we should have such a lovely day and, by the way, how appropriate it is that we should have had such a splendid shower of rain last night. We have scarcely had one since Easter time. Some of the grain sown in April has not even germinated. Can you imagine such a thing? I say, whose fault is it that not a drop can be put on the land? Some of the people in this district have spent hundreds of thousands of dollars—public companies, corporations, and municipalities—and they have all run up against the real thing, gentlemen. They have not got enough money to complete their systems. Now, this is a vital thing—vital in this section of the country. Then, when you stop to think of the large amount of money spent—and, by the way, I have heard it more than once said "Why, these irrigation conventions are C.P.R. propositions." Well, all I can say is that they have done a big thing if they never did anything else, gentlemen, than to put water on the land and make it productive. (Applause.) And when you stop to think of the fact that they have spent millions of dollars, they are good people to follow, gentlemen. But, it is only those who are timid that grumble the most.

Now, it is not time to make a speech with reference to what we ought to have right here and in other districts. I have told you that the people are not able to do it. The Government of British Columbia have organized a Water Branch, and they have secured the services of the most expert men obtainable, and yet those men have not found out a way to give us water, gentlemen. It

is no use making rules and regulations if you have not got the water. The first speech I ever made in the legislature was with reference to irrigation. The Government of the day had been spending hundreds and thousands of dollars in reclaiming land by dikes, and I said "What difference is there whether you put water on the land or take it off in order to make it productive? The results are the same." But the Government had been willing to let other people do that, and now the time has come and, unfortunately too late, when the desirability of a better condition is evident. But the people, had they acted at the time, would have secured the Government ownership of irrigation and it would have been in operation to-day in the southern part and interior of the province of British Columbia. Now, so many millions have been spent in irrigation projects that it is difficult to take them up.

Our experts will tell you that legislation has been framed whereby you can organize associations. It is too late. How can small municipalities under the Act, or any body of men, get sufficient money together at a reasonable rate of interest? The interest is everything in reference to irrigation, when you think of the large amount of land lying idle, and what is it worth? Not much without water. I don't include the whole of this district, because there are exceptions in some sections. They don't need irrigation. But, if most of the places had got some water this year it would have doubled the crop. It grieves me when I have to think of it. Some will say "Why, you ought to be satisfied. You have grown a good crop." Just imagine, gentlemen, it is a critical time when competition is so keen with our neighbours who have irrigation enabling them to produce so much more to the acre. Now, if you can take another crop, it means the profits. That is something, and why should a man be told not to grow another crop. One of my neighbours in the city of Vernon has grown two crops of alfalfa, and there is a third coming. And if the water is not obtainable, who are we to look to? Are we to look to the Government? to the C.P.R? The Federal Government of the United States have spent millions of dollars in irrigation. Surely, when we stop to think of the land we have and remember that it is a paying proposition, and when we think of the amount of agricultural products imported into British Columbia, it is a reflection on the people. Now, I want to say that the Government belongs to you, the Government you make, and whatever you ask for and stay with it, you will get. But don't be lukewarm. You cannot get it by just asking and sitting down. The project is large and means much money, but something must be done.

Last year we imported over twenty million dollars worth of food-stuff. Just imagine that amount in the pockets of the people of British Columbia, and see what it means. Figure the interest of that alone, and consider that we have been doing it for some time. Is there any other way that you could make the land productive than by putting water on it? None whatever, and a young province, with natural resources, ought not to be afraid to undertake it. The people are very much worked up in the southern end of this district, and even those who had water have had a very limited amount.

Now, I do not intend to talk to you at length. I know that the people of Penticton are more than pleased with the turnout, considering everything, and to see so many who are deeply interested in irrigation. You are not here from

idle curiosity. You are here to tell the people what you know. That is what conventions are for, and I am sure that we shall all benefit by the able addresses that we are to hear.

Ladies and gentlemen, I thank you very much indeed, and again on behalf of the province of British Columbia and the people of this district, I welcome you indeed and hope that you will have a splendid time. (Applause.)

CHAIRMAN.—Next we shall have an address of welcome by His Worship Reeve Conklin. I may say that he is not only reeve of the town, but is also chairman of the local Board of Control. The local board is the board that has worked so continuously and indefatigably in every way that would aid in making this convention a success, and they have also done everything in their power to aid in the comfort and the convenience of the visiting delegates. I might mention just one little instance that will illustrate how careful they have been. Last night, a member of the local reception committee who went down to the dock as the boat came in, happened to hear, inadvertently, a remark to the effect that the dust was so deep. You know the result. Before morning this trouble had been removed. (Laughter.)

His Worship REEVE CONKLIN.—Mr. President, ladies and gentlemen, it indeed gives me very great pleasure to offer you Penticton's welcome, for I am sure by the looks of most of the faces I see around me that you are going to get the treatment you are entitled to. I was very pleased to listen to my honourable friend, the Hon. Mr. Ellison, our member. It is not very often we have the pleasure of listening to him. We people here sometimes find it a little burdensome to pay the rates that have to be imposed for the privilege of using water, and while he did not say so directly—still we can read between the lines—I gather from what the honourable gentleman said today that he is coming to our relief by the Government assisting us. Well, that is very glad news, more particularly as one of our delegations has returned from Victoria where it was sent to ask for government assistance and I think their chief difficulty was that when they got there, but few members of the Government were on hand to receive them.

As the honourable gentleman said, the Government is our own, but still our Government does not always do as we would like, more particularly along the said lines, but when we have the word of the Hon. the Minister of Finance, I think after this we may feel perfectly satisfied that we are going to be properly attended to.

I thank you Mr. President, for the kind words you said in connection with the efforts made by the Board of Control and, ladies and gentlemen, I would just like to draw your attention (indicating) to our Board of Control—not including the Hon. Mr. Ellison, although we would be very glad to have him—but you can see that I, as chairman of the Board of Control, have had a pretty strong backing in getting up this entertainment which we hope to put before you. We have on our Board of Control, all the members of our Municipal Council, and most of the Board of Trade, and we have all worked with one object —to put up a proper entertainment for the ladies and gentlemen expected here, and we are very glad to see as many, particularly the ladies.

I might say that we are probably a little disappointed in the number and regret the reason, but, as the Hon. Mr. Ellison pointed out, the war no doubt has been the main cause of there not being a larger representation than at present. However, I feel quite sure from conversations I have had with some and by the appearance of the others, that if we lack in numbers, we more than make up in enthusiasm. (Applause.)

It may not be out of place for me to mention a few of the entertainments in which we wish to have you participate. First, we are indebted to the president of the Kettle Valley Railway, J. J. Warren, Esq., for his assistance. We are looking anxiously forward to the completion of this railway, and Mr. Warren has placed at our disposal, and invites the delegates and their ladies and most of the committees and citizens, up to the number of 250, to participate in an excursion out to the Big Tunnel, for which occasion he has provided special observation cars. (Applause.) After viewing the beautiful scenery of the points to the east, you will have the privilege of going on the same road to the west, where you will be the guest of our sister town, West Summerland. After the return of that excursion, I believe there is to be a session of this convention, after which you are very heartily invited to an automobile ride in cars provided by the citizens. We are indebted to the president of the Aquatic Club—I was going to say of the Bank of Montreal, but I am anticipating a little (laughter)—we are indebted to the courtesy of Mr. J. H. McCoy, president of the Aquatic Club, and you are invited to an aquatic event to-morrow afternoon, to which you have free access and all privileges of members; in fact, I believe we have greater privileges, for the members have to pay their admission, while we have the full privilege of going in D.H. (Laughter.) In the evening, I believe they intend to have a dance. I may be a little mistaken, but we have a fad for dances, whether it is summer or winter, and we are always open to a shaking of the light fantastic. (Laughter.) I am also informed that the prizes won in the regatta are to be presented on that particular occasion to-morrow evening. To the ladies accompanying the delegates, we are very pleased to say that the ladies of our town have formed a committee at the request of the Board of Control, and I am quite sure they will see that you have every attention and entertainment and I might say that if any members or delegates wish to go out and have a good time, they may be sure their ladies will be properly attended to in their absence. (Laughter.) I have heard it remarked that when a gentleman goes away from home accompanied by a lady, he is sometimes glad to be relieved of her. (Laughter.)

Now, I think, ladies and gentlemen, I have mentioned all the principal events that are scheduled to take place during your short stay here, and I am only sorry it is not a little longer. I feel sure you will be of the same mind as you view and taste this fruit, and we desire you to help yourselves. You are welcome to all you can properly get away with. (Laughter.)

Now, Mr. President, ladies and gentlemen, I again bid you welcome to the town of Penticton and we look to see everyone properly at home, and if there is anything you want and don't see, simply ask for it and any member of our board will gratify you. Thank you. (Applause.)

CHAIRMAN: We are now to have another address of welcome from Mr. E. Foley-Bennett, President of the Board of Trade. I am only sorry there are not two or three more.

MR. E. FOLEY-BENNETT.—Mr. President, ladies and gentlemen, it affords me the greatest pleasure indeed to join His Worship the Reeve in extending to you a most hearty welcome to Penticton. Two years ago, our Board of Trade decided to make every effort in securing for Penticton this convention which has to-day opened in session, as we fully realized the inestimable benefit to be derived from the most valuable instruction on irrigation which it is the object of this association to impart. This vast territory throughout the dry belt of British Columbia is depending practically entirely on irrigation for the production of the great wealth in its rich soils. Portions of this territory, hitherto lying idle, have given wonderful results under irrigation and, in consequence, every farmer is most anxious to obtain all the instruction possible.

In view of these facts, we do most heartily welcome to Penticton this distinguished gathering, many of whom have come long distances in order to give us that instruction which means the success of every commercial enterprise throughout the dry belt of British Columbia.

Mr. President, a short time ago the question arose as to whether it was not advisable to postpone this convention in view of the fact that Great Britain was at war, many thinking that this would have a depressing influence. We cannot deny the fact that this is a most anxious time throughout the Empire but, Mr. President, I am sure you will agree with me that no matter what our situation may be, our business obligations must be attended to, and the channels of commerce kept open. This war will bring sorrow to many homes; all wars do, but we can bear our sorrows like Britons, and bravely fulfilling our duties at home and on the field of battle, remain strong in the conviction that our flag will emerge victorious and Great Britain ever retain her impregnable position as arbiter of the world's peace. (Applause.)

This convention will furnish us with most valuable instruction on modern lines, dealing with the best methods of irrigation. To collect together all this instruction has incurred a vast amount of work and much expense, and I sincerely trust that nothing will arise that will interfere with the successful carrying out of this most valuable educational programme provided for us.

Mr. President, ladies and gentlemen, in again welcoming you to Penticton, though we cannot present to you a Calgary or a Vancouver, yet still we can and do extend to you a true western welcome, and it is the determination of every resident in this district to make your visit so pleasant that you will all be looking forward to the time when we will again have the honour to welcome to Penticton the Western Canada Irrigation Association, (Applause.)

CHAIRMAN: The next on the programme is the president's address, by the Hon. W. R. Ross, Minister of Lands. In the absence of our honourable president, this item will have to be omitted. In passing, however, I might say that this is the eighth convention; in other words, the association has been in existence eight years, meeting alternately in Alberta and British Columbia. However, as the name indicates, it is not merely confined to the two provinces of Alberta

The Kettle Valley Railroad, over which some of the delegates will pass
in a special train to attend the Western Canada Irrigation
Convention, Penticton, B. C., August 17, 18, and 19, 1914.

One of the Post Cards used to advertise the Convention.

and British Columbia, but covers certain territory in Saskatchewan where irrigation water has been used; and although it has always gone to Alberta when the convention has been held east of the Rocky mountains, I am afraid that if our friends from Bassano do not put in some strenuous work, the convention may go to Saskatchewan, and you delegates from British Colombia will have a longer trip to take. (Laughter.)

Each year, the work of the convention has grown, and this year we are going to have, I believe, one of the best conventions we have ever had. Unfortunately the delegates are not quite so numerous as we would like to see, for various reasons; still, we are going to have a number of treats in addresses and discussions. We are going to have with us, as no doubt you have noticed, Professor Frank Adams, in charge of irrigation investigations, University of California; Don H. Bark, in charge of investigations, Boise, Idaho; Joseph T. Hinkle, of alfalfa fame; Mr. C. L. Smith, Agriculturist with the O. W. R. & N. railroad, of Portland; and Mr. Arthur Hooker, secretary of the International Irrigation Congress, which meets this fall in Calgary, for the first time in Canada. So that we have, not to mention any of our local speakers, some men from the outside who are going to give us something worth listening to.

Now, not to take up any more of your time, we will ask for the secretary's report, by our permanent secretary, Mr. Norman S. Rankin.

MR. RANKIN: Mr. President, ladies and gentlemen, do not be alarmed because you see me here with this voluminous report in my hands. Since our Seventh Annual Convention, held last summer at Lethbridge, Alberta, several matters of interest to this association have taken place, and though my report when printed will deal with them comprehensively, I will only take sufficient time this morning to speak of those of greatest importance.

Briefly, these matters are as follows:—

(1) Resolutions pertaining to business of the association taken up and brought to issue with the Dominion and Provincial Governments.

(2) Securing for Canada the first Canadian meeting of the International Irrigation Congress.

(3) Assistance rendered to the Cypress Hills Water Users' Association in organizing and conducting their First Annual Convention.

(4) Active part taken in the Oregon Irrigation Congress held at Portland, Oregon, in February, which has resulted in their co-operation in supplying speakers and delegation to this convention to-day.

(5) Revision of membership and representation to our conventions, and adoption of official certificate of appointment.

(6) Appointment of committee representing various irrigation districts in British Columbia which investigated the "Public Irrigation Corporation Bill" and reported back to the Government.

(7) The issue of 2,500 reports to delegates, public libraries and special solicitors. The issue through our mailing list of 1,200 alfalfa bulletins secured from the Dominion Government through Vice-President W. H. Fairfield.

(8) Publication of considerable publicity regarding irrigation in Western Canada, of which books of clippings are open to inspection of delegates.

RESOLUTIONS.

As set forth above, resolutions arising out of the Lethbridge convention, have been taken up and followed through to successful action. These resolutions are set forth in the annual reports (pages 155, 183, and 184) spread around the seats in the hall, but for the convenience of the gathering, I will briefly quote the most important of them:—

Affiliating the Cypress Hills Water Users' Association with the Western Canada Irrigation Association.

Appointment of delegates to attend the 5th Oregon Irrigation Congress at Portland, Oregon.

Dominion and Provincial Governments urged to establish demonstration farms at such points as will meet requirements of country.

Governments asked to take steps to render communication between water users and administration more easy by the establishment of sub-offices, etc.

Revision of the membership and representation to conventions and adoption of Official Certificate only upon presentation of which holder will be entitled to a delegate's rights.

INTERNATIONAL IRRIGATION CONGRESS.

This congress, through the direct efforts of this association, for the first time in its history, and since its internationalization, has been secured to Canada, and will be held at Calgary, October 5 to 9. You will remember that your delegation to the last meeting of this congress assisted in its internationalization, and at that time, and upon request of the Calgary Industrial Bureau and City Council, extended an invitation to that body to hold its 1914 convention in Canada. Although considerable opposition was demonstrated against this step south of the line, the Board of Governors accepted the invitation of the city of Calgary, stating that "They considered such a step in the best interests of the congress to increase the efficiency of the congress and to develop its international character." Secretary Hooker, with whom your secretary kept in close touch during the past year (there being no Congress in 1913) moved his office over into Canada during the latter part of March, and has everything in readiness for the big meeting in October. Fears were expressed by several delegates that the securing of this congress would deflect attendance from our own convention, but this meeting to-day does not justify that fear, and we number amongst our delegates the permanent secretary of the International Congress. Your secretary, being chairman of the Publicity Committee of the International Irrigation Congress, has been able to make frequent reference to the Eighth Annual Convention of this Association in the publicity matter issued by the International Congress, with benefit to both meetings.

In this connection, it would be unfitting did I not make reference to the generosity of the Dominion Government and the Governments of British Columbia and Alberta in supporting the International Congress with necessary grants. The city of Calgary and the Canadian Pacific Railway also assisted in this way.

FIRST ANNUAL CONVENTION, CYPRESS HILLS WATER USERS' ASSOCIATION.

On January 28, the Cypress Hills Water Users' Association held their first convention at Medicine Hat, and in accordance with the request of their secretary for speakers, your secretary was able to induce Messrs. F. H. Peters, Commissioner of Irrigation, Calgary; S. G. Porter of the Department of the Interior, Calgary; Professor W. J. Elliott, Principal Provincial Agricultural School at Olds; H. C. McMullen, general Live Stock Agent, C. P. R., Calgary;

and R. J. Burley of the Department of Interior, Calgary, to go down and address the gathering. The following is the programme, which was an interesting and educational one:—

The meeting will convene at 1.30 p.m.

1.30—Hon. President, D. J. Wylie, "Opening address."

1.45—Acting Mayor, Charles Pratt, "Address of welcome."

2.00—E. F. Drake, Dominion Superintendent of Irrigation, Ottawa, "Back to the Land." Discussion.

2.30—Walter Huckvale, "The Lethbridge Convention." Discussion.

2.50—F. H. Peters, Commissioner of Irrigation, Calgary, "Practical Hints on Irrigation in the Cypress Hills." Discussion.

3.15—Norman S. Rankin, Permanent Secretary Western Canada Irrigation Association. "Saskatchewan has all the winners."

3.30—S. G. Porter, Irrigation Branch, Department of the Interior, Calgary, "Business Methods Applied to Farming. "Discussion.

3.55—Prof. W. J. Elliott, Principal, Agricultural School, Olds, Alberta, "Educating the Farmer's Boy and Girl." Discussion.

4.20—R. J. Burley, Irrigation Branch, Department of the Interior, Calgary, "The Value of Reservoirs to the Farmer," Discussion.

4.40—H. C. McMullen, General Live Stock Agent, C.P.R., "Live Stock on an Irrigated Farm." Discussion.

Evening session will convene at 7.30 p.m.

7.30—Secretary's Report. Discussion.
Reading the minutes of last meeting.
Other business.
Election of officers for ensuing year.
Adjournment.

Mr. E. F. Drake, Superintendent of Irrigation, showed his interest in the meeting by coming all the way from Ottawa to be present at this Convention, and the meeting was said to be productive of valuable results to the farmers in that district. In order to secure as much publicity as possible for the Convention, the newspapers were supplied with the following article, which I quote from the Medicine Hat *News*:

"The First Annual Convention of the Cypress Hills Water Users' Association opened in the city hall this afternoon at 2 o'clock, with the Honorary President D. J. Wylie, M.L.A., in the chair. He gave a short address, emphasizing the objects of the Association, and the bright prospects ahead of them in their work. Although the organization was only one year old, there were in its ranks the men who would make the irrigation work grow and prosper. He called upon Acting Mayor Pratt to address the meeting. Mr. Pratt regretted that the Mayor was not present to welcome them, but nevertheless took pleasure in extending a hearty welcome to them in behalf of the mayor and city. He was quite cognizant of the importance of the gathering, and was certain that much valuable information would be gained at the meeting which would further the work of irrigation in the province and district.

"E. F. Drake, the Dominion Superintendent of Irrigation at Ottawa, spoke on the subject "Back to the Land" which was of especial interest because of the intimate knowledge of the situation in the West which the speaker manifested, and because of the valuable information that he gave to the delegation present. He stated that although there were 76,000 acres of land included in the various irrigated schemes in the Cypress Hills district, only about 10,000 of this acreage was already developed.

"The pressing need of development of the agricultural resources of the country was explained by statistics showing that the world's production of grain and meat were falling far below the increase in population. 'To bring back the people to the land' was the solution to the great problem, and this object could be best gained by making the farms more attractive or more profitable, which amounted to practically the same thing.

"He discussed the resolutions presented last year by the Association describing the progress of the plans for establishing water reserviors both north and south of the Cypress Hills. The department had not thought it advisable at this time to establish a branch at Maple Creek, because of the undeveloped state of many of the irrigation projects of this section. He also explained the method of gauging the water in the streams and the reasons of the department for so doing.

"R. J. Burley, of the Department of Interior at Calgary, gave an instructive address on "The Value of Reservoirs to the Farmers" explaining how the great waste of water from the flow of the streams from the hills was wasting much water each year.

"He estimated the total loss in one year from the Hills, to be in the neighbourhood of 25,000 acre-feet of water, or approximately enough water to irrigate 25,000 acres. The methods advised by the department included the damming of the streams in the beds in the small lakes and sloughs and in reservoirs constructed near the streams. The success of the projects would probably lie in the development of many small reservoirs at small cost rather than through the erection of large and expensive projects. He stated that the department was deeply interested in the problem and much good work could be expected from them along this line.

"F. H. Peters, Commissioner of Irrigation at Calgary, gave an interesting and instructive address, 'Practical Hints on Irrigation in the Cypress Hills.'

"Following him on the programme was Norman S. Rankin, Secretary of the Western Canada Irrigation Association; S. G. Porter of the Irrigation section of the Department of the Interior, Calgary; Professor W. J. Elliott, Principal of the Provincial Agricultural School at Olds; R. J. Burley of the Irrigation Section of the Department of the Interior, Calgary; and H. C. McMullen, General Live Stock Agent for the C.P.R., Calgary.

"The evening session was devoted to addresses not heard in the afternoon and to routine business. The following officers were elected.—

"Honorary Presidents—Hon. W. R. Motherwell and Robert Needham.
President—R. G. Williamson.
1st Vice-President—I. H. Williams.
2nd Vice-President—Thomas Hargrave.
Secretary-Treasurer—G. S. Herringer.
Executives for the eleven districts were chosen as follows.—

1. Joseph Dixon, Maple Creek.
2. C. Stearns, Gull Lake.
3. W. Huckvale, Medicine Hat.
4. W. Barrington, Medicine Hat.
5. D. Drinnan, Walsh.
6. G. Stewart, Maple Creek.
7. S. Unsworth, Piapot.
8. Dan Morrison, South Fork.
9. T. A. Drury, Maple Creek.
10. D. Wood, Coulee.
11. Isaac Stirling, Nashlyn.

"Walter Huckvale was selected to succeed W. X. Wright as representative to the Western Canada Irrigation Association this year, which automatically places him on the executive of that body. It was decided to petition the Saskatchewan Government for a grant to assist the association in its work and the matter of establishing reservoirs for storing surplus water for irrigation, was presented to the Dominion Government."

Dr. J. G. Rutherford, C.M.G.
Superintendent of Agriculture & Animal Husbandry, C.P.R. Calgary Alta.

Mr. Walter Huckvale,
Medicine Hat, Alta.

Mr. W. X. Wright
Member Executive Committee from Cypress Hills Water Users Association, Maple Creek, Sask.

Mr H. W. Grunsky, Water Rights Branch, British Columbia Government

Professor W. J. Elliott, Principal Provincial Agricultural School, Olds, Alta.

THIRD ANNUAL CONGRESS, OREGON IRRIGATION CONGRESS.

In accordance with your resolution authorizing the executive to appoint two or more delegates, a delegation consisting of the Honourable Duncan Marshall, F. H. Peters, O. Kirkwold, Wm. Young and your secretary, attended the Third Oregon Irrigation Congress held at Portland on February 13 and 14. Your delegation was very courteously received, were the guests at a luncheon tendered by the Commercial Club on Friday, the 13th, and were given the entire evening of Friday to address the delegates under the head of "Lessons on Canadian Methods." There was no expense to the Association in the visit of the delegation to Portland.

The Honourable Duncan Marshall, Minister of Agriculture for the province of Alberta, spoke on "Agricultural Education and Live Stock as Related to Irrigation Farming." Wm. Young, (representing the Honourable W. R. Ross, Minister of Lands for British Columbia, and the President), spoke on "Irrigation in British Columbia." F. H. Peters, Dominion Commissioner of Irrigation, Calgary, outlined "Irrigation in the Prairie Provinces." Your secretary also spoke briefly, extending greetings from your association to the Oregon gathering and expressing the hope that the delegation would take part in our convention at Penticton.

Mr. Marshall's address was a splendid one, arousing enthusiasm on all sides and bringing him an ovation at its close. President Thompson said at its conclusion and referring to the visit of the Canadian Delegation "that they had thought Secretary Hinkle had made a mistake in inviting the Canadian delegation over there, but they wanted now to say to him that he had made no mistake, and that the visit of the Canadians had assisted agriculture and irrigation in their state more than they could tell." He congratulated Secretary Hinkle and the delegates, for having had the opportunity of listening to them.

The newspapers of Portland treated the delegation with much courtesy, both in their accounts of the addresses and by photographing the delegates and furnishing copies of the photographs for reproduction; a copy of one of such photograph will be found in this report.

Your secretary was able to announce that the International Irrigation Congress would be held in Calgary, in September, and sent the following telegram to the Honourable Mr. Ross:

> "Western Canada Irrigation Association delegation here today unite in expressing regret at your inability to be present and assure you that we are upholding the dignity of your Association and the aggressiveness of our country."
>
> NORMAN S. RANKIN
> DUNCAN MARSHALL
> O. KIRKWOLD
> F. H. PETERS
> WILLIAM YOUNG

to which Mr. Ross replied fittingly.

Canadian delegates at Oregon Irrigation Congress, Portland, Oregon, February, 1914.

The Canadian Press were sent the following wire on the evening of the 14th:—

> "Oregon Irrigation Congress opened to-day with two hundred seventy delegates attending. Alberta delegation of four, led by Duncan Marshall, attracts much attention. Canadian guests of Commercial Club at luncheon; given freedom of city by mayor and occupied seats of honour on platform. Entire evening's programme 13th devoted to addresses by Canadians. Secretary Irrigation Association, Calgary, extended greetings from Western Canada Irrigation Association and invited Oregon to send delegation to Penticton Convention this summer. Announced the fact that International Irrigation Congress would be held in Calgary in September, which caused much enthusiasm, many stating intended to come and participate. Dominion Commissioner Peters outlined irrigation law and existing and future prospects. Wm. Young, British Columbia, representing the Hon. Minister Ross, outlined similar conditions in British Columbia. Speech of evening that of the Hon. Duncan Marshall, Minister of Agriculture, on live stock and agriculture in Alberta; spoke hour and a quarter and received ovation at conclusion. Peters gave credit to J. S. Dennis and William Pearce for irrigation inception and development in Alberta and Saskatchewan. At conclusion motion proposed carried unanimously that delegations from Oregon attend the International Irrigation Congress at Calgary and the Western Canada Irrigation Association, Penticton. Great interest manifested Western Canada and all things Canadian."

Your secretary reported at length to your executive all matters of interest connected with the congress.

It is apparent that exchanges of delegations between these congresses is resulting in much publicity for irrigation in Western Canada.

REVISION OF MEMBERSHIP AND REPRESENTATION.

One of the important resolutions passed by the Convention at the Lethbridge meeting was that dealing with the revision of membership and representation to the Convention. This was brought about owing to the fact that year after year delegates in spite of the fact that they are advised in the *Official Call* to bring proper credentials from the proper authorization, have not done so; forty-four of those attending the Seventh Annual Convention being delinquent in this respect. The matter was discussed by the meeting and a committee consisting of Messrs. William Pearce, Dr. C. W. Dickson, and E. Foley-Bennett appointed to look into the matter and report back to the executive in sufficient time to allow of their recommendation being brought into force by the Eighth Annual Convention. I am glad to report that this step has been duly taken, and the official memorandum of appointment and official certificate of appointment used here to-day are the result of the committee's action, and were sent to all delegates with the *Official Call*. Each delegate is required to fill out the two certificates, have them signed by the proper authority, forward the memorandum by mail to the local secretary at the point where the convention is to be held, and bring the certificate with him for presentation at registration headquarters upon arrival. This has eliminated the difficulty heretofore met with in deciding who are properly delegates (with all a delegate's privileges) to the convention.

Official

Memorandum of Appointment

as a Delegate to the Eighth Annual Convention to be held at Penticton, British Columbia, August 17, 18 ——& 19, 1914——

This is to Certify *that, pursuant to the official call, I have appointed and commissioned*

Name _____

Address _____

City _____

State _____

To Represent _____

_____

at the Eighth Annual Convention of the Western Canada Irrigation Association, to be held at Penticton, British Columbia, August 17, 18 & 19, inclusive, 1914.

In Witness Whereof, *I have hereunto set my hand this* _____

day of _____ *1914*

_____

THIS MEMORANDUM IS TO BE FILLED OUT SIMILAR TO THE ACCOMPANYING CERTIFICATE, AND MAILED TO THE LOCAL SECRETARY OF THE EIGHTH ANNUAL CONVENTION AT PENTICTON, BRITISH COLUMBIA.

☞ FILL OUT AND RETURN TO THE SECRETARY OF THE ASSOCIATION

Official

Certificate of Appointment

as a Delegate to the Eighth Annual Convention to be held at Penticton, British Columbia August 17, 18 & 19, 1914

This is to Certify *that, pursuant to the official call, I have appointed and commissioned*

Name _____

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To Represent _____

_____

at the Eighth Annual Convention of the Western Canada Irrigation Association, to be held at Penticton, British Columbia, August 17, 18, & 19, inclusive, 1914

In Witness Whereof *I have hereunto set my hand this*

_____ *day of* _____ *1914.*

_____

_____

ON ARRIVING AT THE CONVENTION, DELEGATE SHOULD PRESENT THIS CERTIFICATE, PROPERLY FILLED IN AND SIGNED BY THE PRESIDENT, SECRETARY, MAYOR OR OTHER AUTHORIZED OFFICER OF THE NEWSPAPER, RAILWAY, SOCIETY, COMPANY, ASSOCIATION, CITY, TOWN, BOARD OF TRADE, DEMONSTRATION FARM OR BODY HE REPRESENTS, AT THE REGISTRATION HEADQUARTERS, WHEN OFFICIAL BADGE WILL BE FURNISHED AND DELEGATE ENTITLED TO ALL THE RIGHTS OF THE MEETING, SUBJECT TO THE REPORT OF THE COMMITTEE ON CREDENTIALS.

This committee were also charged with the matter of further exciting public attention sufficiently to bring larger representation from the farming districts to our prairie conventions, and will no doubt have suggestions to be laid before the meeting here to-day.

PUBLIC IRRIGATION CORPORATION BILL.

In November, Dr. C. W. Dickson, who was then in Vancouver, was appointed a special commitee of one to go to Victoria and look into matters in connection with the Public Irrigation Corporation Bill then before the Government, and report fully at an executive meeting to be held in Vancouver, December 15. Prior to that meeting, however, the committee reported as follows:—

> "I secured a copy of the last printed draft of the Irrigation Bill and studied some of its principal features, getting a number of outside opinions on it. The conclusion was that the Bill in that form was utterly impossible from numerous points of view. I also wrote to the Hon. W. R. Ross, telling him the substance of my letter from the executive, and asking for an early appointment to discuss matters. To this letter, I received no reply.
>
> "In the meantime, a long article appeared in the press, apparently written with authority, outlining a proposed new Government measure. (See Vancouver *Province*, November 27, page 3.) This item caused Mr. W. R. Pooley, of Kelowna, to make a trip to Victoria, and I accompanied him. We had interviews with the Hon. W. R. Ross, Mr. William Young, Comptroller of Water Rights, and Mr. E. W. Grunsky, who has been framing the Bill. Mr. Grunsky has prepared a report on the water question, and has entirely re-drafted the Bill to try and meet objections to the first attempt. Both report and draft are still in typewritten form, and have just been submitted to the Minister, who at the date of our visit had not been giving them his consideration. Mr. Ross intends to have the Bill printed after he has looked it over, but did not think this would be possible in time to place it in our hands for the executive meeting on the 15th of this month. In the meantime, the department is unwilling to give out information as to details, in view of possible alterations that may be made before the draft is printed.
>
> "This is the situation to date and unless something new develops within a week, I will have very little to report on the matter. Mr. Young and Mr. Grunsky might come over to meet our committee if they received a special invitation. I should also like to see a representative or two from irrigation interests, to get their point of view."

Upon instructions of the Executive Committee, Dr. Dickson then invited the Hon. Minister of Lands to send Messrs. William Young and H. W. Grunsky of the Provincial Water Rights Branch of the Land Department to attend our executive meeting at Vancouver on the 15th, and make an exposition of the Bill, which invitation was accepted. The committee, under the chairmanship of the Hon. W. R. Ross, convened at the Vancouver hotel, eight out of the total eleven attending, with Messrs. Dennis, Fulton, and Hays unable to be present. After the regular routine business had been disposed of, Mr. Grunsky outlined briefly the proposed new Irrigation Bill, which underwent discussion, after which the president appointed a committee consisting of Messrs. E. Foley-Bennett, J. C. Dufresne, Vernon, and Fred. Anderson, Kamloops, to devise ways and means of obtaining the widest possible publicity in order to get the opinion of the public, promising ample time for the consideration of the Bill by all irrigation interests. President Ross expressed his appreciation of the interest which the W. C. I. A. were taking in this matter.

On January 23, the committee received copies of this Bill, Mr. Bennett advising that he had appointed representative men from different centres south of Vernon, and had written Mr. Dufresne at Vernon, and Mr. Anderson at Kamloops, to do the same in their respective districts, calling a joint meeting of the whole committee on January 30 at the Incola Hotel, Penticton. In his letter of advice, Mr. Bennett said: "The action of the executive in having this committee appointed is warmly approved by the whole of this district and I trust that the report of the committee will meet the approval of the department."

Following is the report of that committee (which may be seen on the table files) dealing with the Okanagan territory:—

A committee meeting was held at the Incola Hotel, Penticton, on January 30, 1914, at 8 p.m.

PRESENT: E. Foley-Bennett, in the chair; W. T. Shatford and P. H. Eraut representing Penticton and southern country; C. H. Cordy, Summerland; Scott-Blackwood, Westbank; and J. C. Dufresne and A. E. Ashcroft, Vernon.

The chairman explained the purpose of the meeting, and it was decided to take up the Act, page by page; whereupon the following suggestions were made and unanimously adopted:—

Clause 2, page 9.—Under definition of system, that the words "twenty-acre tract" in the fourth line be struck out, and "parcel of land" substituted.

Clause 2, page 9.—Under "irrigable lands" that the word "improvements" in the last line be replaced by the words "buildings and curtailage." Explanation dealing with above suggestion: Present clause would be inconsistent with interpretation of "improvements."

Clause 2, page 10.—After the word "person" in the second line from the top of page 10, insert the words "or body corporate." This clause should also include the holder of a sale agreement under the terms of which he is liable to pay taxes.

Page 10, section 4.—Should also provide for corporate seal.

Page 12, section 6, subsection 4, clause "F."—The committee would ask that this section be struck out, and that the Government be asked to stand this additional expense, recouping themselves therefor in the same manner as for their engineering investigations.

Explanation of the above clause: The committee felt that the raising of funds in advance of incorporation would make the work of the originators of any irrigation scheme under this Bill more difficult.

Page 16, clause 16—That a clause be inserted whereby all nominations for the office of assessor be approved by the board.

Page 17, section 17, subsection 2—Strike out the words "resident of this province" in the fifth line.

Explanation of the above suggestion: It is customary for the land owners living out of the province to have their lands planted in orchards, intending to live on these lands when the orchards come into bearing, and it was felt that in

order to encourage the investment of capital, absentees should have a voice in all matters pertaining to water corporations in which they are interested.

Page 22, section 25—Provisions should be made for qualified voters' names being added after the list has been certified correct and closed as per Municipal Act.

Page 28, section 31, subsection 1—Strike out the word "male" in the second line, and the words "British subjects" in the third line, and substitute therefor the word "elector."

Explanation of the above suggestion: It was felt by the committee that any land owner chosen by the community, whether male or female, British subject or not, should be eligible to represent that community. It was also pointed out that there are certain settlements of Forcijuros, who would find it practically impossible to obtain British representatives as trustees, which, if insisted upon, would militate against the investment of foreign capital.

Section 31, subsection 2, clause "G"—That this clause be struck out.

Section 31, subsection 1—That the words "territorial limits" in the fifth line, be struck out, and "province of British Columbia" be substituted.

Page 29, section 23—That a penalty clause of $50 (fifty dollars) be inserted for any trustee refusing to sit after being elected as per "Municipal Clauses Act."

Page 30, section 33, subsection "B"—That provisions be made for trustees holding office for three years, one-third to retire each year.

Explanation of the above suggestion: The point was particularly urged by P. H. Eraut, who has had the supervision of the Penticton irrigation for several years; who urged that it was imperative to have in office a certain number of trustees who had former experience. The committee was thoroughly in accord with this suggestion.

Page 31, section 35—Insert penalty clause for trustees refusing to take office as per "Municipal Clauses Act."

Page 34, section 50, subsection "B"—If this section does not already empower telephone hours for the operation of the system, the committee thought it would be well to do so, and suggest the following wording:

"The trustees may provide telephone service for the economical operation of all parts of the system; and have the right to erect poles and string wires across or along any roads or right of way; and where necessary, across any lands, whether Crown lands, private or municipal property."

Page 41, section 57—It was felt by the committee that the trustees should be allowed to spend up to a certain amount, say $500 (five hundred dollars), on their own responsibility in case of emergency.

Page 44, section 61—Should have fair wage clause and prohibition on Asiatic labour clause, as per "Municipal Clauses Act."

Page 45, section 60—Provisions to be made, whereby by-laws would cite bonded indebtedness of corporation, as per "Municipal Clauses Act."

Signed:

E. FOLEY-BENNETT	Chairman.
J. C. DUFRESNE	
W. T. SHATFORD	
P. H. ERAUT	Committee.
A. E. ASHCROFT	
SCOTT-BLACKWOOD	
C. H. CORDY	

Your secretary wrote to Mr. Anderson, who did not attend the Penticton meeting, sending him a copy of the Okanagan meeting recommendations, and asking for his endorsation or criticism, suggesting that he call upon Mr. Fulton, and discuss the matter with him. Following is Mr. Anderson's letter:

KAMLOOPS, B.C., February 21, 1914.

NORMAN S. RANKIN,
Secretary, W.C.I.A.,
Calgary, Alberta.

SIR,—I duly received yours of the 10th instant. The recommendations made by the committee at the meeting held in Penticton, January 30, 1914, are satisfactory to me.

It is very difficult to get a fair consensus of opinion on the proposed "Public Irrigation Corporation Bill," as the idea is really foreign to those interested in irrigation in this district. Personally, I think it is pretty heavy machinery for the rather small watershed in this district, but other parts will most likely be able to utilize such an Act to better advantage.

From good authority in the United States it appears that private operation by irrigation corporations has not been very successful financially and, personally, I think that the Provincial Government should undertake the full construction, operation, and contract of the required works.

It is not easy to see why the Government should not undertake works of this nature. If it cannot be made profitable under private operation it does not seem that there would be very much chance of a more favourable result under Government operation. In short, if the Government can afford to build the works and lose the interest on the investment, as is being done in the United States, ultimately these works may repay their cost. The value of the interest lost to the Government is made up many fold by the benefits to the community as a whole.

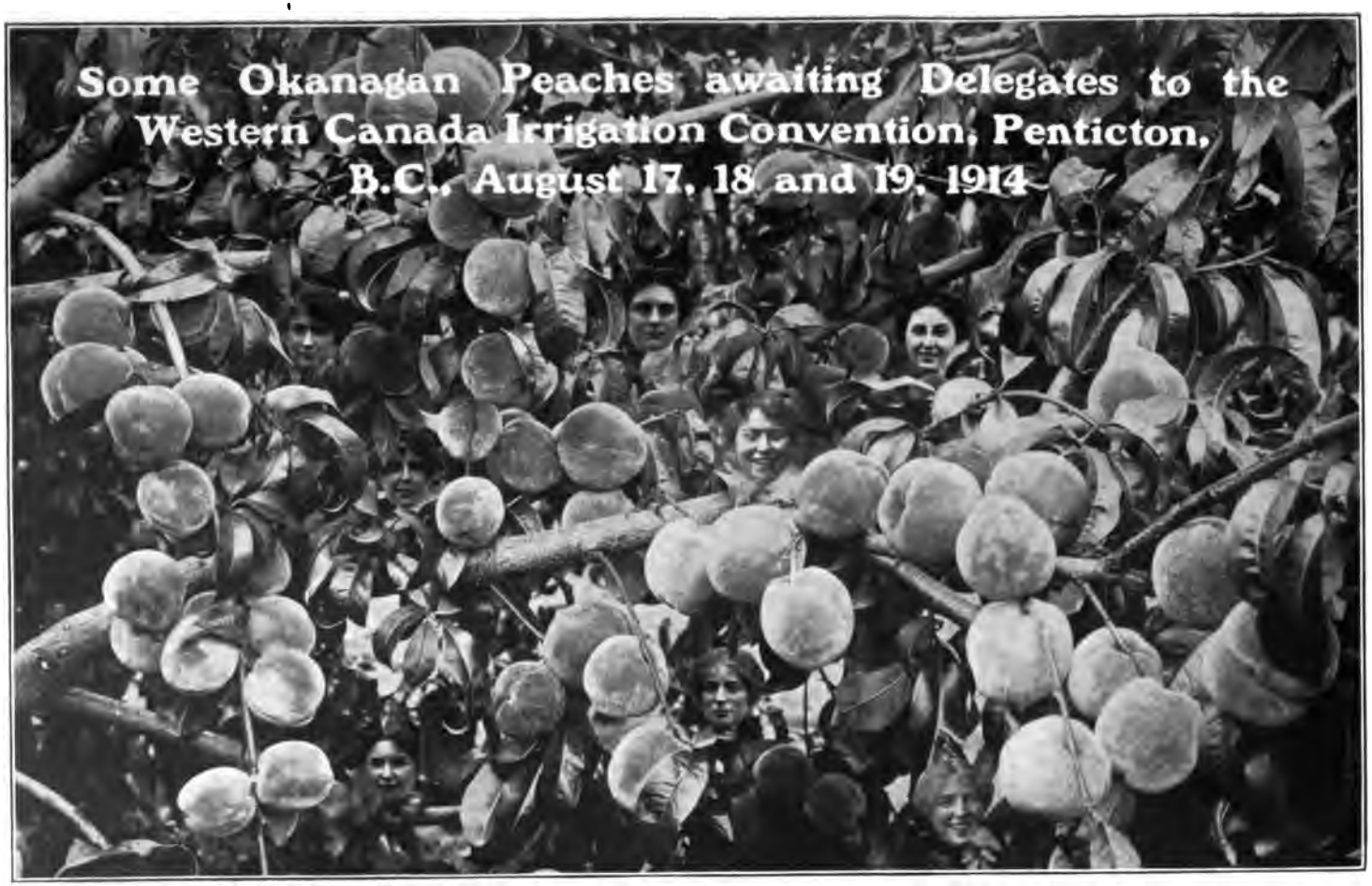
It is interesting to note that the average cost of water in the United States from Government works is about $12 per acre less than from recent private works of comparable size. This difference is accentuated by the greater probability of the water users under Government projects receiving an adequate water supply, as this matter has been given more careful consideration and deficiency guarded against with greater care than in private investments.

I am, sir,

Respectfully yours,

F. W. ANDERSON, *C.E.*

Copies of these recommendations and all communications were sent to the executive as they came in.


Some Okanagan Peaches awaiting Delegates to the
Western Canada Irrigation Convention, Penticton,
B.C., August 17, 18 and 19, 1914

One of the Post Cards used to advertise the Convention.

Copy of the report as submitted by Mr. Foley-Bennett was at once forwarded to the Honourable Minister of Lands, to which Mr. Grunsky replied as follows:

VICTORIA, B.C., March 6, 1914.

NORMAN S. RANKIN, Esq.,
Secretary, W.C.I.A.,
Calgary, Alberta.

Re Public Irrigation Corporation Bill.

DEAR SIR,—The Minister turned over to me the report of the committee held under the auspices of the Western Canada Irrigation Association concerning the Irrigation Bill before the Legislature. Prior to the time when this report reached here, it had been decided to incorporate the Irrigation Bill into the Water Act itself, and time did not permit all the suggested changes to be made. Nevertheless, all those which were approved and which bore on the organization of the corporation were carefully considered and, for the most part, incorporated. It was thought that such of the others as are approved could be introduced next year, and that in the meantime their absence will not seriously interfere with the formation and conducting of any public irrigation corporation.

Very truly yours,
H. W. GRUNSKY.

CLOSER COMMUNICATION BETWEEN WATER USERS AND GOVERNMENT.

The resolution bearing on this matter may properly be divided into two heads, namely:—

(*a*) The establishment of sub-irrigation offices,

(*b*) The establishment of demonstration farms,

both of which were promptly taken up with the Dominion and three Western Provincial Governments. To the first head, which covers also a resolution from the Cypress Hills Water Users' Association to the Dominion Government, the Dominion Minister of Agriculture refers the matter, under date of September 8, to the Hon. Minister of the Interior, who referred it through Superintendent of Irrigation Drake to Commissioner of Irrigation Peters at Calgary. Mr. Peters' reply is to the effect that "This matter had been brought up to him previously by the Cypress Hills Water Users, and at that time he had replied that the time was not yet ripe for such an advance." This covered the Dominion and the Saskatchewan and Alberta Governments.

The British Columbia Government replied by letter from the Hon. Minister of Lands, W. R. Ross, under date of December 10, as follows:—

VICTORIA, December 10, 1913.

NORMAN S. RANKIN,
Western Canada Irrigation Association,
Calgary, Alberta.

DEAR SIR,—I beg to acknowledge your letter of December 6, with enclosed resolution No. 3, passed by the Western Canada Irrigation Association at their convention at Lethbridge.

I have, for some time, fully realized the situation as outlined in the resolution so in the reorganization of our Water Rights Branch the object has been not only an efficient system, but a capable staff who would administer in the interests of the public as a whole.

Before giving you an outline of the reorganized Water Branch and its work, I wish to direct your attention to the difficulty under present methods of administration of establishing, by the Department of Lands, of demonstration farms

at such points as will meet the particular requirements of the country, as suggested in the resolution. This difficulty lies in the fact that administration and operation of the experimental farms comes under the Agricultural Department. This feature of the resolution should go before it and, on receiving favourable consideration, water rights may be acquired in the usual way, and such assistance as would be necessary in the installation of an irrigation system would be available in the Water Rights Branch.

The amendments to the Water Act at the last session of Parliament provided the necessary machinery for administration and forthwith organization was undertaken. The Board of Investigation was reorganized with new powers, a Comptroller of Water Rights appointed thereto, and the staff of the general office at Victoria increased early in March. Sub-offices were opened for the district engineers in Cranbrook, Revelstoke, Nelson, Grand Forks, Penticton, Nicola, and Kamloops.

Inasmuch as the resolution refers particularly to district engineers, I would call your attention to the powers under the amended Act, they have, and the order of work laid down for them by the Comptroller of Water Rights. The powers in question are set out in section 205 of the Act, a copy of which you will have. Since "beneficial use" is the keynote of the Act, you will note how such powers will bring the engineer into close touch with the water user. The order of work as laid down is as follows:

1. Engineering investigation of old records.
2. Systematic and continuous work in stream measurement.
3. Study of the duty of water.
4. The prevention of wasteful use of water.
5. Policing of streams.
6. Economic distribution and delivery of water.
7. Inspecting water systems to determine their efficiency and safety.
8. Determination of storage possibilities.
9. Investigation of water-powers.

The "Investigation of old records" is first because of its great importance. On the whole, there are some 8,000 old records throughout the province that must be carefully gone into and determinations arrived at before we can hope to properly administer water in all districts. For this purpose the Board of Investigation was created with special powers. It has been found from experience that before the Board can intelligently take up a record they must have an engineering report showing what use is being made of the water. In the districts south of the railway belt, this work is progressing rapidly and is now so far advanced that in looking forward to next season our district engineers will be in a position to take up the work that will be of advantage to individual water users and the district as a whole.

With regard to "systematic and continuous work in stream measurements" inasmuch as the Dominion Government decided to maintain their Hydrographic Survey in the railway belt, after turning over the water administration to the province, it was realized by both Dominion and Provincial officials that if best results were to be obtained, this work should be under one head. Accordingly the "British Columbia Hydrographic Survey" was organized with headquarters in Vancouver, under Dominion supervision and with Provincial co-operation. This arrangement has now been working five months, and has proven satisfactory. The gain for the province has been the acquirement of the services of a staff of trained hydrographic engineers. While it is not expected that they will reach out to every part of the province at once, considerable progress has been made. The Water Rights Branch is doing its share, and where gauges have been established such are gradually going under the supervision of the Hydrographic Survey.

In the matter of the "study of the proper duty of water" our experience this season has been that it will be more advantageous if it were taken care of by a special department under the Water Branch. During the winter, a capable man with agricultural training will be employed to take charge of this work. We will have the co-operation of the district engineers and their assistance.

By means of the arrangement of hydrographic surveys and the organization of the Duty of Water Department, the district engineer will, to a great extent, be free to give the greater portion of his time to those important matters as set out in items 4, 5, 6 and 7, as above.

One of the most important lines of work is the "determination of storage possibilities" in some of the districts, particularly the Okanagan. Plans are now being made for the coming season. Such work will include topographic surveys to determine drainage areas. It is impossible to state just how much of this work we can accomplish in one season, but a special effort will be made to cover as much of the country around Okanagan lake as possible, without jeopardizing thoroughness.

In some of the districts where irrigation matters are not so contentious, we will spend some time on the "Investigation of water-powers." Many small water-powers are being neglected, which if developed would be of great advantage locally. What is required to bring these powers to the attention of the public is investigation that will show what the economic development in each instance will be. As regards the importance of small water-powers for irrigation purposes, investigation has in one instance shown that 6,350 acres have been brought under irrigation through pumping by electricity to an elevation of 104 feet, the amount of electricity used being 1,000 horse-power. In this respect it would be of exceptional interest to know what acreage of land around Okanagan lake would come within the 100-foot contour, and the various water-powers that might be made use of. I merely draw your attention to this that you may see we are alive to the situation and that the work as outlined, when carried into effect, will be of some value in solving many water problems.

Referring again to our sub-offices, which with one exception have been in existence since March, the experience of the season has shown them to be of great assistance to water users. Their success, however, depends on the men in charge.

In conclusion, I would like to add that we have given the water administration of British Columbia careful study. The organization of effective administration machinery is not one of a few months, but one of evolution and will take time. Many factors enter into the problem and, being an economic one, in our desire to establish sound principles,we have perhaps, made haste slowly.

Yours very truly,

W. R. Ross,
Minister of Lands.

DOMINION GOVERNMENT.

To the second head, the establishment of demonstration farms, the Hon. Minister of Agriculture writes from Ottawa as follows:—

OTTAWA, September 8, 1914.

NORMAN S. RANKIN, Esq.,
Secretary, W.C.I.A.,
Calgary, Alberta.

DEAR SIR,—I am directed to acknowledge the receipt of your letter of the 31st ultimo, embodying a resolution passed at the recent convention of the Western Canada Irrigation Association, held in Lethbridge. The Minister has

carefully noted the recommendation that demonstration farms should be established in the irrigation districts of the West, and wishes me to point out that demonstration work is more a matter for the Provincial than the Dominion authorities. There is a Dominion Experimental Farm in the vicinity of Lethbridge, where irrigation is practised. There is also one at Invermere, B.C., and before very long, a new farm will be established in the Okanagan district. It is suggested that the question of providing demonstration farms for the different districts should be taken up with the Provincial Departments of Agriculture concerned.

That portion of the resolution suggesting the establishment of sub-irrigation offices or the periodical visiting of a qualified officer to enable water users to obtain information and advice, concerns the Minister of the Interior, and it is being brought to his attention.

Yours faithfully,

WM. IDE,
Private Secretary.

SASKATCHEWAN.

The Hon. W. R. Motherwell, Minister of Agriculture for Saskatchewan, replied on December 15, and April 28, as follows:—

REGINA, SASKATCHEWAN, December 15, 1913.

DEAR MR. RANKIN,—I have for acknowledgment your favour of the 6th instant, enclosing copy of resolution No. 3, passed by the Western Canada Irrigation Association at their convention held in Lethbridge last August, which resolution I have noted carefully.

I may say for your information that the matter of establishing small demonstration farms in this province is at present receiving the consideration of the authorities of the College of Agriculture, and I have no doubt but that something will be done along this line in the not very distant future.

Yours very truly,

W. R. MOTHERWELL.

REGINA, SASKATCHEWAN, April 28, 1914.

DEAR MR. RANKIN,—Replying to your favour of the 20th instant, *re* demonstration farms in this province, I regret that I have nothing further to add to my letter of December 15 last, with reference to this question. This matter is receiving the consideration of the college authorities, but no definite policy has yet been announced by them.

W. R. MOTHERWELL.

ALBERTA.

The Hon. Duncan Marshall, Minister of Agriculture, replied as follows:—

EDMONTON, December 31, 1913.

DEAR SIR,—I have your letter and might say that it is not the intention of our Government to immediately establish any further demonstration farms,

although it is our policy just as soon as these farms are well under way and there is a demand for more farms and schools, to establish further ones, and when that is taken up, we will certainly keep the irrigation requirements of the province in mind.

Yours very truly,

DUNCAN MARSHALL.

The policy of the Alberta Government in this connection as set forth by the Hon. Mr. Marshall, in a previous request was as follows:—

DEAR SIR,—I have your letter asking what steps the Government has taken in the establishment of an agricultural college, and in reply would enclose memorandum of what we propose doing in agricultural education, from which you will see that it is not our present intention to immediately establish an agricultural college.

Yours very truly,

DUNCAN MARSHALL,
Minister of Agriculture.

MEMORANDUM.

The policy of the Alberta Government is to erect upon two or three of the demonstration farms, agricultural schools to be supplemented by other schools as the demand grows; to begin in these schools with a three months' course, at the end of which term a diploma will be granted in practical agriculture, this diploma to be an entrance to the agricultural college to be established later on, where the scientific course in agriculture will be given to the man who wishes to obtain the degree of bachelor of scientific agriculture. The exact details of these courses will, of course, be determined as the system is developed, but it is intended that they shall include instructions in live stock and grain, soil cultivation, dairying, poultry raising, courses in mechanical work, such as blacksmithing and carpenter work as is required on the farm, courses in the operation of gasoline and steam engines, and instruction for girls in domestic science. By establishing these schools in different parts of the province they will be easy of access to farmers' sons, and experience has gone to show that the nearer you can bring a school to the farmer's boy, the better chance he has of availing himself of its instruction. These schools will be placed on the demonstration farms and there the students will have the very great advantage of the practical work done on the farm. They will be able to observe from day to day the application of scientific methods to a farm no larger than most farmers in the province occupy, and this land being operated with a view to making its occupation profitable. It is quite true that in the erection of an agricultural college it is comparatively easy to build what will be a bigger show place with the appearance of doing greater things, but that is not our object in this province. Our determination is to bring scientific instruction in agriculture as near home to the farmers in different parts of the province as possible.

BRITISH COLUMBIA.

VICTORIA, December 15, 1913.

DEAR MR. RANKIN,—Your letter of the 6th instant, enclosing resolution No. 3, which arrived during my absence, has been duly brought to my attention.

In reply I may say that the department has had in operation some demonstration orchards; but we have now decided definitely to make some general demonstration along the line of agriculture in the different sections of the province. We have already made several selections of land, and the work will be carried out under the supervision of our experts connected with the Agricultural Department.

Wishing you the compliments of the season,

Yours sincerely,

PRICE ELLISON,
Minister of Finance.

OFFICIAL REPORT.

The official report was in the hands of the Government at Ottawa for publication inside a month after the close of the convention at Lethbridge, but owing to an exceptionally heavy run of governmental printing it was not turned out until March. Total issue amounted to 2,500 copies, which now seems to be inadequate, as I had call for over 500 additional copies. The association is growing in membership and the demand for additional copies comes not only from these new delegates, but from those interested in irrigation south of the line, and from many public and private libraries. We should have at least 3,000 for distribution this year. Appended is a letter from the office of the superintendent in the premises:—

OTTAWA, March 17, 1914.

SIR,—I beg to acknowledge the receipt of your letter of the 12th instant requesting to be supplied with 500 more copies of the report of the Seventh Annual Convention of the Western Canada Irrigation Association.

In reply I beg to state that only 2,500 copies of this report were printed. It was thought that this would be a liberal supply sufficient to meet all requests that might be made for same. Of this number, 2,000 copies were sent direct to you; 50 copies to the Commissioner of Irrigation for distribution amongst the members of his staff; one copy was mailed direct from this office to each of the delegates at the convention, totalling 125 copies. This left 325 copies which were retained here for general distribution. Of this number, only some 50 or 60 copies remain. I regret, therefore, that I am unable to comply with your request. Next year, when having this report printed, we will ask for a larger number.

Your obedient servant,

W. M. BAILEY,
For Superintendent of Irrigation.

Some 1,200 bulletins on alfalfa were supplied by the Dominion Government through Vice-President Fairfield and sent to our mailing list. Within a month from their issue, dozens of inquiries began to come in for additional copies, which indicates the general interest that is being taken by the farmers in the culture of alfalfa.

The association is indebted to Mr. F. H. Peters for securing from the Government for illustration here to-day and elsewhere, large photographs and small wooden models showing the best and handiest types of farmers' wooden headgates

both completed and at different stages of construction. It is Mr. Peters' idea that this will assist in making clear to the farmers the proper way to build such headgates, dimensions, etc.

GOVERNMENT GRANTS.

The association is indebted to the Dominion Government for a renewal of their grant of $500.

The association is indebted to the British Columbia Government for a renewal of their grant of last year of $1,000.

The association is indebted to the Alberta Government for a grant of $500. This gave us a working capital of $2,000 for the year.

In order that the Governments who assist us yearly with grants, and the delegates may know how this money is expended, I attach herewith a comparative statement of actual expenses incurred at the last two conventions, and upon which the expenses of the present meeting is based. There is not included in these statements working expenses for the period between conventions, such as the sending of delegations to irrigation congresses in the United States, stationery, printing, stamps, executive meetings, etc. The expense of the executive meeting at Vancouver on December 8, the agenda of whose meeting is given, approximated $300.

COMPARATIVE STATEMENT OF EXPENSES INCURRED AT THE KELOWNA AND LETHBRIDGE CONVENTIONS, AUGUST 1912 AND 1913.

		Kelowna 1912	Lethbridge 1913
Transportation expenses of four speakers, including secretary and assistant		$ 569 15	
Transportation and expenses of three speakers, including secretary and assistant			314 78
Stenographer's report, including hotel and travelling expenses			172 80
Stenographer's report including hotel and travelling expenses		187 65	
Grant expended by local Board of Control which covers hire of hall, local arrangements and local printing	$ 500 00		
Printing, badges, engraving, cuts, etc., on account of convention, incurred at Calgary	359 15	859 15	
Printing at Calgary account convention	299 70		
Salary or bonus to local secretary	200 00		
Hire of theatre for three days, and moving picture hall	163 60		
General and local expenses, stamps, photos, badges, ushers, advertising, cuts, etc	363 76		1,027 06
		$ 1,615 95	$ 1,514 64

NOTES.

Kelowna paid the local secretary's salary for four months at $100 per month.

Kelowna, from grant of $500, settled local printing accounts, hire of hall and other general expenses. The City Council had a small deficit on account of entertaining to make up.

Kelowna's convention lasted four days.

Kelowna's expense for bringing in speakers was materially higher than Lethbridge's on account of greater distance from international boundary.

Lethbridge City Council and Board of Trade made a grant of $500 to cover expenses of general entertainment, banquet, and picnic luncheon. Expenses incurred at Lethbridge not met with at Kelowna:—

Hire of theatre.....	$ 163 60	
Bonos to local secretary.....	200 00	$ 363 60

Lethbridge convention lasted three days only.

EXECUTIVE COMMITTEE MEETING, VANCOUVER, DECEMBER 15, 1913, VANCOUVER HOTEL.

Agenda.

1. Roll call of officials.
2. Minutes of last meeting.
3. Financial report.
   - (*a*) Cost of Lethbridge Convention.
   - (*b*) Cost of Kelowna Convention.
   - (*c*) Grants for 1914.
   - (*d*) Balance in bank, December 1, 1913.
4. Resolutions.
   Report on status of resolutions passed at Lethbridge Convention.
   (Resolutions Nos. 1, 3, 4, and 5.)
5. Report of Committee on Membership and Credentials.
   (Resolution No. 6.)
   Wm. Pearce, Chairman.
   Dr. C. W. Dickson.
   Mr. E. Foley-Bennett.
6. Appointment of Delegation to Oregon Irrigation Congress.
   (Resolution No. 2.)
7. Report on advisability of formation of Special British Columbia Committee.
   Messrs. Lawrence and Stobart, proposers.
   (Resolution No. 10, 1912)
8. Discussion of Penticton Convention.
   - (*a*) Speakers
   - (*b*) Special features
   - (*c*) Special railway rates, file 5,421.
9. New business.
   British Columbia Irrigation Bill.
10. Adjournment.

FORMATION OF SPECIAL BRITISH COLUMBIA COMMITTEE.

At the executive committee meeting held in Vancouver, December 15, the matter of the advisability of the formation of a special British Columbia committee to deal with matters in that province, as brought up by Mr. C. E. Lawrence, at the Lethbridge Convention, was discussed and votes registered from British Columbia delegates, who were in attendance at the Lethbridge Convention, and who were requested by letter to tabulate their vote. The resolution was defeated and the matter tabled, the secretary being instructed to advise the proposer and seconder that the matter would be considered at the Penticton Convention if they then desired to bring it up again. The following letter was sent to Mr. Laurence by your secretary:—

VANCOUVER, December 16, 1913.

DEAR MR. LAURENCE,—Your resolution regarding the formation of a special British Columbia Committee to deal with irrigation and agricultural matters, keep in touch with the Federal and Provincial Governments, etc., came before the executive committee yesterday afternoon. Only votes were recorded from those British Columbia delegates who were in attendance at the Lethbridge Convention, nor did the executive vote, other than the British Columbia members who attended that convention. The resolution was defeated. The executive, however, did not declare the resolution lost, but ordered it tabled to be brought up at the desire of the proposer at the Penticton Convention.

In discussing the matter after registration of the vote, it seemed to be the opinion of the executive that the formation of such a committee as you proposed was no longer necessary, as the executive committee itself was keeping in pretty close touch with the Government regarding all irrigation matters, this meeting demonstrating the interests they were taking, eight out of eleven being present.

A special committee of three, with power to add to their numbers, was appointed to take up the discussion of the proposed Irrigation Bill in their various localities, of which Mr. F. Anderson, of Kamloops, was made a member.

I have sent full details of the executive meeting to Mr. F. J. Fulton, who was not present, from whom you can get them.

I will put your resolution on the programme to be brought before the Penticton meeting, if you will so advise me.

Yours faithfully,

NORMAN S. RANKIN.

The file dealing with this matter (No. 10) may be seen on the table by the door amongst the other files, by any one who is interested in this matter.

GENERAL.

During the committee meeting at Vancouver in December, President the Honourable W. R. Ross, was the guest at the Progress Club, along with the members of the executive committee. Mr. Ross addressed the meeting on "Land Settlement and some of its Problems."

Your executive also attended the Forest Fire Conference which was held in Victoria December 15 and 16.

Owing to the change of location from Kelowna to Vancouver, Dr. C. W. Dickson presented his resignation to the executive on December 15, which was accepted, and Mr. J. W. Woolsey, Kelowna, elected in his place. Dr. Dickson having returned to Kelowna in April and Mr. Woolsey leaving there at that time, Dr. Dickson was re-elected to his old position, which he now holds.

Dr. Dickson's letter follows:—

VANCOUVER, B.C., October 22, 1913.

DEAR SIR,—At the Lethbridge Convention of the Western Canada Irrigation Association, I had the honour of being elected to the executive committee of the Association to represent the Kelowna district. As, however, I am no longer resident in that district, and cannot therefore fairly claim to act as its representative, I feel that it is my duty to retire in favour of some one else, who will be in closer touch with the irrigation interests of the Okanagan.

Will you kindly place my resignation before the executive at the earliest possible opportunity, so that my successor may be in a position to co-operate in making the 1914 convention at Penticton an unqualified success.

You will realize that I am taking this step with the deepest regret and after mature consideration, and with the understanding that if I can at any time be of use to the Association, my services are at your command.

Permit me to express my sincere appreciation of the unfailing courtesy extended to me by yourself and other officers of the Association during the several years I have had the pleasure of acting on the executive.

Yours very truly,

C. W. DICKSON.

FINANCIAL STATEMENT, WESTERN CANADA IRRIGATION ASSOCIATION, 1913-14.

Receipts.

1913—Balance carried forward as per bank account		$ 1,849 75
Refund on unexpended portion of emergency cheque (1912-1913) No. 41		40 57
1914—British Columbia Government grant		1,000 00
Alberta Government grant		500 00
Dominion Government Grant		500 00

Expenditures.

1913—Expenses, transportation, etc., speakers to convention at Lethbridge	$ 255 35	
Rent of Majestic Theatre and Moving Picture hall	163 60	
Stenographic report and expenses of stenographer	172 80	
Printing, engraving, stationery, etc	166 71	
Grant and salary to local and permanent secretaries, etc	400 00	
Transportation and expenses, five members executive to attend meeting at Vancouver	253 50	
Secretary's salary for five months	208 30	
1914—Printing programme, official calls, badges, photos, stamps, cuts, folders, postcards, etc.	278 85	
Expense delegates to Oregon Irrigation Congress, Portland	18 05	
Travelling and hotel expenses, meeting of programme committee at Sicamous	105 70	
Grant to local board for Penticton Convention	500 00	
Secretary's salary for seven months	291 62	
Balance in bank	1,075 84	
	$ 3,890 32	$3,890 32

H.J.R.

Certified correct,

NORMAN S. RANKIN.
Permanent Secretary.

NOTE.—$500 less was received this year in grants than last year, and greater expense, $154.94, was necessary for preliminary arrangements of convention, distance from Calgary to Penticton, meeting of executive at Vancouver and meet-

ing of programme committee at Sicamous. Secretary made two trips to Sicamous and one to Penticton. Taking these facts into consideration, the cash balance in bank is about equal to that of last year.

PUBLICITY.

A carefully-thought-out persistent campaign of publicity has been carried out, which began quietly in the month of April and ran through May along the same lines. In June and July we increased the publicity matter issued, and I am glad to report that articles put out to various papers throughout the West have, through their courtesy secured us an approximate circulation of half a million or, to be exact, our articles were accepted by 300 papers in the three western provinces, having a combined circulation of 596,132. I have issued over 300 photographs of officials of the Association, members of the local board, and prominent speakers, and those who care to look over these clippings will find them in a book on the little table in front of the platform. (Applause.)

CHAIRMAN: We have with us to-day, Dr. Frank T. Shutt, Chemist for the Dominion Experimental Farm at Ottawa. He has been connected with the Experimental Farm for many years, and has therefore had an opportunity of watching the development of agriculture in the West from very small beginnings as compared to its present state. Dr. Shutt has always taken a very keen interest in irrigation, not only in British Columbia but in the Prairie Provinces as well, and I have no doubt that his observations will be very interesting.

Dr. SHUTT: Mr. President, ladies and gentlemen, it is needless, I am sure, to assure you of the great pleasure it has given me to be present at this convention and being really an unexpected pleasure, it is all the greater because it is less than a week ago that I was certain that I might be here. I have not travelled from Ottawa all the way to be present with you. As regards irrigation, I know very little about it and am really here as a listener, being anxious to gain what information I can on the subject. I am now in my twenty-seventh year of service, and it was due to the activity of the late Deputy Minister of Agriculture, I think, that I paid my first visit to the province after the establishment of a farm at Agassiz in the earliest days, though there was no irrigation there, the conditions being different. But for several years I came out here and made little cursory agricultural surveys of the valleys which might prove to be of agricultural value in the future—the Okanagan, Nikola, Columbia, Coast, and Vancouver island. It has been my good fortune to watch with much satisfaction the progress that has been made.

I know that mining, of course, takes a prior position, but I have great confidence in the future and expect to see agriculture looming very large in the work and lives of those in this beautiful province. It has very many charms. I cannot recall the first time I came to Penticton, but I well remember a meeting we had of an agricultural nature and I really think I can speak—not egotistically at all—of the good work the Experimental Farm system has done. We cannot, of course, the chief officers, reach all our people personally. We should like to

do that, for great benefit is to be derived from knowing the men and that has been a strong feature in our work, I think, from the first; that there should be no line of demarcation, and that we should get close to the man on the soil and try to understand the difficulties and problems he is up against from his point of view. That has helped us in our purely experimental farm work. We have, of course, instituted, and with much value, experiments of many kinds on our own account, but in a sense I think the more valuable part of our work has been brought about by inquiries received from those on the land. And so we enlist sympathy, and encourage, as much as possible, correspondence, and we endeavour to assist as far as we are able with chemical analyses and with examinations of weeds and insects.

Of course, twenty years ago the provinces did not have much of a staff of experts in botany, entomology and chemistry, but there have been great changes since that time and now in very large measure you in British Columbia have your own officers nearer. Still, in regard to chemistry, there is yet great opportunity for us to help you with soil fertilizers, and fungicides and insecticides; but agricultural chemistry is really interwoven with every branch of farming, whether specialized or general. Therefore, I reiterate the importance and value of it to you. You should take advantage of it, and first of all from your own farm at Lethbridge. In this connection, it is very gratifying to hear Mr. Fairfield spoken of so highly all over the province. (Applause.) Everybody assured me that he is the right man in the right place. Of course, in British Columbia you have other stations, although I mention Mr. Fairfield because he has charge of the only experimental station at the present time in which we experiment with irrigation. Our other stations in British Columbia are carrying on agriculture in a more or less humid climate. Of course, I say nothing as to the future, but I know you are all looking forward to the establishment of something not far from here, and it may come about. We are already at work in the Nikola valley. Our system has grown from five experimental farms to over twenty in active operation.

With regard to conventions, I am a utilitarian myself. I recognize, of course, the value of the social side of this affair. I think that is an admirable part, but I think sometimes there are occasions when we lose sight of the educational side of the question. Perhaps you are not all so serious as I am; life is serious enough, but I think if we can take away only one or two things we shall feel that we have not altogether wasted our time. I am glad to see on the programme a number of very practical subjects. I cannot help you with regard to the use of water on the land; nevertheless, I am very much interested in irrigation, and I have been spending a fortnight in Alberta, studying right from the soil in connection with our analyses, the influence of the application of water on the Canadian Pacific irrigation tract. I had been over it before the water was applied. You are not going to be troubled here as they have been, either climatically or with the soil; nevertheless, one cannot help being impressed with the fact that, as the Hon. Price Ellison has said, there are other things besides the actual application of water.

We have heard much lately of dry farming. It is apparently a new term and a very novel one, but when we look into it, it is merely the emphasizing of

certain features of good farming the world over; it is really the conservation of moisture, and really, it seems to me that it is as necessary for you to practically apply the principles of so-called dry farming as it is with the people east of you on the plains. It is apparent to every one how this country is suffering to-day from lack of moisture, and it is quite evident from what was said this morning that there has not been a sufficiency of water to give to your crops that which is required for their growth and development; and if that is so, how necessary then it is to understand the principles of the conservation of moisture. We have been carrying on experiments on western stations for some time to determine just exactly those cultural operations which will tend to the greatest conservation of all the soil moisture. Conservation of moisture must go hand in hand with the application of water. It has always seemed to me that the man who could get along with the least water, provided he had a sufficiency, is going to be the best off in the long run. You see, a soil when it is full of water is not in the best condition for plant growth.

I must not begin to be didactic on this occasion, but it has been a great pleasure to me to renew old acquaintances all down the valley, and also to make many new friends. I make no lines of distinction between personal and what I might term professional friends. They are all one in agriculture. I am heartily in sympathy with their objects. They assist me and I, in some little measure, endeavour to assist them. I am quite sure our pleasant relationships will continue and I wish you all success and a great deal of pleasure at this convention. (Applause.)

CHAIRMAN: Owing to the fact that some of the speakers have not been able to get here on time this morning, the executive has found it necessary to somewhat change the programme for to-day and part of to-morrow, so that if we do not follow the printed programme literally, you will understand the reason.

We have with us a representative of the Department of Agriculture for the province of Alberta, Mr. George Harcourt, Deputy Minister, who will now speak to us.

MR. HARCOURT: Mr. President, ladies and gentlemen,—I am indeed pleased to be present on this occasion and to renew acquaintances down the valley, having been in Kelowna two years ago. There is a good deal in common between the two provinces, and noticing how dry it was during my journey, I was reminded of some portions of our own province this year. It is not quite as bad, although serious enough, but I think on the whole we will have from 80 to 90 per cent of the crop of last year, and with probably higher prices we will have more money to buy your fruit than perhaps last year.

You don't know how this section of the country appeals to me, with its fruit and possibilities, but probably you will understand it better when I say that I come from the Niagara district, and how I have missed the fruit on the prairie! I hope some day that we will grow quite a bit of fruit on the prairie. Small fruits grow well wherever there is protection and I must say frankly that there is no excuse for any farmer in Alberta not having all the small fruits he wants for his own use. The larger fruits we hope to grow, because where there is shel-

ter we have certain fruits growing that indicate to us that the cultivated fruits will grow, but it may be some time before we have any great success with them.

I am sorry the Minister of Agriculture could not be present. I know he would have enjoyed this trip and I am sure could you have heard his address at Portland, you would have been more than delighted to have heard him. I may say frankly that it was one of the best addresses on agricultural education I have had the pleasure of listening to. He has taken a great interest in agriculture and realizes that it is necessary to put that work in the most attractive form for the people. Of course, we have people from different climates, countries and walks of life attempting to follow agriculture and if it were not the very best profession under the sun, they could not make a success of it, but to reach the highest success, it is necessary to teach these people what to do and how to do it. We have been carrying on an active campaign in taking out instruction to the farmers through short courses and farmers' institutes, and we have taken out carloads of stock to teach desirable lines of conformation. We have gone a step beyond and started schools of agriculture. We have three of these schools instead of one central institute and they have been a success far beyond our most sanguine expectations. Professor Elliott, of the school at Olds, is to speak to you on that subject and we also have here the principal of the school at Claresholm.

I am very pleased to be here for another reason to accept the hospitality of your town, because of the importance of irrigation. While this is the eighth convention of your Association, we are really only beginning to understand irrigation and one of the things we are learning is that we don't know, and when we get to that point, we are in line for progress because we are going to find out. Our farmers started out first to irrigate for grain and not finding that very successful, they are now starting fodder and particularly in Alberta and around east of Lethbridge where it is pretty dry, it is really a sight for sore eyes to see the fields of alfalfa and the abundance of fodder.

I trust that a great deal of good may come out of this convention. The social side is necessary. Farmers, and I suppose fruit growers, are a little too prone not to get out. It is not always what we hear but it is meeting each other and discussing problems between sessions that enables a man to pick up more information and obtain a wider view of the foundation and causes of the great work in which he is engaged, thus more adequately preparing him to carry on his work. I thank you, and I trust that you will have a most successful convention. (Applause.)

CHAIRMAN: We have with us a representative of the Cypress Hills Water Users' Association, Mr. Walter Huckvale, of Medicine Hat.

MR. HUCKVALE: Mr. President, ladies and gentlemen,—I have felt more pleased at being in Penticton for the last twelve hours than just at this moment, and I fully recognize that it is owing to an unfortunate situation in the progress of civilization that has called many of our speakers away that I am called upon to fill a little gap, which is all I am able to, as you may notice.

First of all I would like to thank the gentlemen of Penticton, in particular, and of British Columbia for their hearty welcome, and I assure you that I am not only anticipating a great deal of useful instruction from the meetings of the convention, but I am heartily looking forward to enjoying some of your pleasure in lake, mountains and fruit. I have rather to apologize for my fellow members of what is known as the Cypress Hills Water Users' Association. I confidently expected several more here, and hope still to hear of that later. Just now, I am the only member present and in apologizing for the other members, I might also state to you that there is some considerable excuse for their absence. Last year, they were feeling in very high fettle, prosperous, and had made up their mind to work together and land this convention for Maple Creek in 1915, but a change has come over their dreams. As explained to the convention last year, the association is in rather different shape to the other irrigated portions of

Main Street, Penticton, B.C.

Canada, as they have to use water from creeks that have an intermittent flow. Last winter, the neighbourhood of the Cypress Hills was almost entirely snowless and this spring it was almost rainless, therefore they have not been able to irrigate in that portion of the country and the territory has dried up, and instead of having an abundance of fodder for stock, they may have to import fodder to keep their stock alive. You will therefore understand that perhaps a number of them do not feel like taking a rather expensive rail and lake journey no matter how much they might regret omitting a visit to Penticton.

In that part of the country, I might say that the efforts of irrigators are devoted almost entirely to growing fodder crops and the stock is fed almost entirely on the farms or ranches of small irrigationists. In coming down yester-

day I did not see much of your beautiful country, but I saw a little, and I might suggest that it would not be a bad thing if some of your fruit growers would devote a little corner to growing a little hay and other fodders, and growing a little more live stock, but as I understand one of the most eloquent speakers from the prairie is going to touch on that, I will not discuss the point further now.

I also represent the Board of Trade at Medicine Hat. It is not an irrigated country at the present time, and the country surrounding it is almost useless without irrigation, but we have a very large project nearing completion and in two or three years we confidently hope there will be all sorts of crops suited to that particular part of the country raised near Medicine Hat. We hope then that Medicine Hat will be seen sufficiently delighted that we will be able to carry the delegates by storm and to welcome you therefore in that city in the not far distant future. I thank you very much for your hearty welcome to the men from the prairies. (Applause.)

CHAIRMAN: As you are all doubtless aware, there is going to be a meeting of the International Irrigation Congress at Calgary this fall, and in connection with the congress there is going to be an exhibition of products of the soil raised by irrigation. We have with us today, Mr. E. L. Richardson, Chairman of the Committee on Exhibits for this exposition and I might incidentally mention that he is also manager of the Calgary Exhibition which, as you are nearly all perhaps aware, is one of the largest fairs on the prairie. Mr. Richardson would like to say a few words to you and point out the importance to British Columbia and doubtless to the Okanagan valley, of being represented with some form of exhibit.

MR. RICHARDSON: Mr. Chairman, ladies and gentlemen,—I am very glad to have an opportunity of extending an invitation to those present to attend the twenty-first International Irrigation Congress to be held at Calgary on October 5 to 9 next, for first time in Canada. At the last congress they voted a change of name from National to International.

In connection with this irrigation congress, one of the special features will be an exhibition not only of irrigated products of the land but non-irrigated products, and the committee have arranged a prize list especially for displays in which over $4,000 will be offered in cash and prizes for district exhibits, starting at $500 for the first prizes, and for some displays, $250, and we are confidently looking to those who are present here to help make this end of the irrigation congress a success.

Another feature of the exhibition is that there will be no charge of admission We expect a very large attendance and there is no charge for space. We will be very glad to have applications from all districts. We are already assured of some from this valley and I am not sure which of the first prizes Penticton has picked out. They are going to make an effort anyway to bring back one of the "firsts," so I trust we will have as many present as possible at Calgary from this gathering. I assure you we will use every endeavour to make it a success and feel confident that you will have as good a time as I am sure the members of this convention will have here. (Applause.)

Grapes grown in the open 4 miles south of Penticton, B.C.

CHAIRMAN: The last address that we will have this morning will be by Mr. Arthur Hooker, Secretary of the International Irrigation Congress to be held in Calgary this fall. He has been connected with the irrigation Congress for a number of years, and will talk on "The Work of the International Irrigation Congress."

MR. HOOKER: Mr. Chairman, members of the Western Canada Irrigation Association, ladies and gentlemen,—As a representative of a great irrigation organization, it is hardly necessary for me to express my appreciation of the invitation extended to me to attend and address this meeting of an important association engaged in this very great work. For a number of years the meetings of the International Irrigation Congress in the United States have been attended by representatives of the irrigation interests of the Dominion, both in official and private capacities. That the interest in the work of the great parent organization on the part of the people of Canada has not been unappreciated is evidenced by the fact that this year, for the first time in its history, the International Irrigation Congress meets without the borders of the United States, its twenty-first annual convention being held in Calgary, in the province of Alberta, October, 5, 6, 7, 8, and 9, 1914.

To my mind the irrigator is perhaps the highest type of worker in that great movement in which we should all be enrolled as workers of the common good, namely, the great movement which has been briefly stated in a popular motto of the Irrigation Congress "Make easy the path of the homebuilder." Surely there can be no greater work than that of making more homes on the land: answering the call of the manless land for the landless man. Particularly at a time like this when great nations are struggling to preserve the family rights of the people does the importance of the homebuilding work of the irrigator stand out in striking prominence.

The International Irrigation Congress was organized at Salt Lake City, September 15, 1891. Like every great movement starting from a small beginning, the work of the Congress has had its ups and downs, its successes and its times of trial. Following the organization in 1891 no meeting was held the next year, in 1892, but the interest in the irrigation continued to grow, and two years later, in 1893, another meeting was held in the city of Los Angeles, California.

At this time it is interesting to note that the second meeting of the organization was called an International Irrigation Congress. However the work of the movement did not progress sufficiently to develop a world-wide organization at that time and the title "International" did not cling to the movement, so that for several years the organization was known as the National Irrigation Congress. At various times the international feature was emphasized through the holding of an international exhibition in connection with the meetings of the congress and through the extension of formal invitations to foreign governments to send representatives to its meetings. In fact, throughout practically the entire life history of the Irrigation Congress, there has been evinced a gratifying interest in its work on behalf of the people of other nations. For several years past there has been a committee of the congress considering the feasibility

of a great international meeting. In this connection it is curious to note that the general idea was that it would be most appropriate to hold it perhaps in Mexico, or some of the southern countries where irrigation is of considerable importance to parts of the nation. The increasing importance of the international feature was emphasized, until at Salt Lake City in 1912 the name of the congress was again changed to "International", and later the invitation to Calgary was accepted for the meeting to be held in that city this fall.

The International Irrigation Congress has been a leader and holder of public thought since that memorable meeting of the little band which assembled for the first time in Salt Lake City in 1891. At that time they were considered visionary, impractical dreamers. Many leaders of the "old-guard" have lived to see the congress dream more than realized.

Irrigating young prune trees by means of deep furrows on each side of the tree rows. (Photographed near Yuba City, California).

The men who have been behind the International Irrigation Congress, and whose efforts have given it the commanding position which it now occupies, are of that kind who believe that the way to do things is to do them. It follows that the history of the congress is a record of achievement,—and what a wonderful record it is! It is doubtful if there are many persons who to-day fully realize the importance of the work started and fostered by the Irrigation Congress.

One hundred, two hundred, or five hundred years from now, history, in looking back over the record of the era, will be able to place a just estimate upon the work accomplished by the forces set in motion through the International Irrigation Congress in its effort to save " the forests, store the floods, reclaim the deserts, make homes on the land."

The Reclamation Act, the Carey Act, and other State and national legislation, particularly in the United States, have accomplished that which was only dreamed of a few short years ago. But it has done more than that which

the enabling clause contemplated. It has placed the seal of government approval upon all reclamation work, and thereby given to it a standing, created a confidence in it, which otherwise never would have been, and this has made it possible to enlist private capital and enterprise to an extent hardly realized, making the irrigation, reclamation and homebuilding movements to-day one of the most remarkable in the world's history.

Benjamin A. Fowler, of Phoenix, Arizona, when president of the organization said;

> "The Irrigation Congress stands for no party, no interest, no clique and no section of the country. It should be the forum where all parties could be heard, all individuals have the same rights, no section monopolizing or controlling the action of the congress, which stands for the whole country, and especially for the irrigation needs of the great arid west. In this organization we know no north, no south, no east, no west. We should not be influenced by the political platforms or policies as against the truest and best interests of the nation as a whole.
>
> "Full discussion of every question should be allowed, not only allowed but invited. There may be sharp differences of opinion and judgment, but they should be the differences of gentlemen where patience, forbearance and universal courtesy are not only the rule but absolutely required and demanded of each speaker. Only by such a policy as this will the Irrigation Congress reach its high ideals, ever achieve the results for which it is aiming, while on the other hand to pursue an opposite course is to invite destruction and decay.
>
> "This should be the constant policy of the congress. We have nothing to cover up or conceal, and on its platform must be 'Equal rights to all and special privileges to none.'"

The general officers of the congress are: President, Major Richard W. Young, of Salt Lake City, Utah; First Vice-President, J. B. Case, of Abilene, Kansas; Second Vice-President, Judge John Fairweather, of Fresno, California; Third Vice-President, S. H. Lea, of Pierre, South Dakota; Fourth Vice-President, Richard F. Burges, of El Paso, Texas; Fifth Vice-President, Kurt Grunwald, of Denver, Colorado. The active management of the affairs of the congress is in the hands of an International Board of Governors, and a Local Board of Control. The members of the Board of Governors are: Chairman, Geo. A. Snow, of Salt Lake City, Utah; Major Richard W. Young, President of the Congress; J. S. Dennis, of Calgary, who is chairman of the Calgary Board of Control; Douglas White, of Los Angeles, California; Lou D. Sweet, of Denver, Colorado; L. Newman, of Great Falls, Montana, and the Secretary of the Congress.

The plans for the meeting at Calgary are in the hands of a Board of Control, with J. S. Dennis, Assistant to the President of the Canadian Pacific Railway, chairman; C. G. K. Nourse, Manager of the Canadian Bank of Commerce, as Vice-Chairman, and Industrial Commissioner, Andrew Miller as Secretary. The Board of Control consists of some seventy representative men of the city of Calgary, and members prominent in government, business, irrigation and agricultural circles throughout the provinces of the Dominion.

Each state and province is entitled to appoint a member upon the International Executive Committee, from which the Board of Governors is chosen, and also to appoint an Honorary Vice-President. It may interest you to know that the member for the Executive Committee from the Dominion is Dr. C. W. Dickson, of Kelowna, and the Honorary Vice-President is Norman S. Rankin, of Calgary, the permanent secretary for the Western Canada Irrigation Association. Since it has been organized, the Irrigation Congress has held meetings in Los Angeles, California; Denver, Colorado; Albuquerque, New Mexico; Phœnix, Arizona; Lincoln, Nebraska; Cheyenne, Wyoming; Missoula, Montana; Chicago, Illinois; Colorado Springs, Colorado; Ogden, Utah; El Paso, Texas; Portland, Oregon; Boise, Idaho; Sacramento, California; Spokane. Washington Pueblo, Colorado; and Salt Lake City, Utah. To this list will shortly be added Calgary, Alberta.

As set forth in its constitution, the objects of the irrigation congress are: First, to promote and diffuse knowledge concerning irrigation and other uses of water; second, to facilitate conference and deliberation among the people of the country concerning irrigation and related interests, and Third: to provide means for bringing the needs of the people of the country before state and federal governments.

The personnel of the congress includes the officers of the Irrigation Congress, the cheif executive of any nation; the vice-chief executive of any nation; the Cabinet members of any nation; members of the highest legislative body of any nation; governors of states and provinces; members of federal, dominion, state, and provincial irrigation, water and conservation commissioners; state and provincial engineers and commissioners of agriculture and horticulture; the mayor of each city or town having a population of over one thousand; executive committeemen; honorary vice-presidents and members of boards of control; chairmen of general and special committees, permanent delegates, and delegates appointed under the provisions of the constitution including fifty delegates appointed by the governor of each state, province or territory; ten delegates appointed by the mayor of each city of more than twenty-five thousand population; five delegates appointed by the mayor of each city of less than twenty-five thousand population and over one thousand; five delegates duly accredited from each commercial body and club concerned with public interests; two delegates appointed by the mayor of each incorporated town having a population of less than one-thousand; two delegates duly accredited by each regularly organized association devoted to irrigation, agriculture, horticulture and engineering; two delegates duly accredited by irrigation or canal company; two delegates duly accredited from each college or university.

To quote from proceedings of past congresses, the harnessing of the floods of our great western rivers, compelling them to turn death to life, desolation to beauty, deserts to gardens, barrenness to fertility, poverty to wealth, and degradation to civilization, was but a few years ago considered a wild fancy. Nevertheless, we ourselves have seen all this accomplished by the pioneer and the United States Reclamation Service. The end is not yet. To quote the late Governor Johnson of Minnesota, "There are still in the West, homes for the

homeless, food for the hungry, work for the unemployed, land for the landless, danger for the brave, an unknown world to conquer, and room for all."

As the construction of the United States reclamation work goes on the need for the existence of this congress is demonstrated and emphasized. No one will deny but for the Irrigation Congress, both the Irrigation Act and the Reclamation Service of the United States would never have been, and the histroy of the arid West would have been very different from what it is today, and yet even the people in the localities in arid America which are most benefited by this law, have to-day little comprehension of this fact. Not many of them realize that the monumental structures of masonry and concrete which the Federal Government is now constructing, destined as they are to play such an important part in contributing to the wealth, happiness and prosperity of the arid West, are all

Testing depth of percolation after irrigation by means of a sharp steel rod 6 feet long. (Photographed near Fair Oaks, California).

the tangible results of the vigorous propoganda which for years before the passing of the National Irrigation Act the Irrigation Congress carried on for irrigation, forestry, and reclamation.

A former president of the Irrigation Congress states, that while the benefits derived from irrigation are often given in measurable terms by acres of land brought under ditches, by bushel or tons of products, and by increased population of arid states, all this, great though it be, fails to express the full measure of the benefit, for the chief gift of irrigation lies in the raising of the standard of excellence. Nor does the tale more than begin with the raising of the standards in products. Even this hardly passes the threshold of irrigation gifts in higher standards. The improvement in methods both demands and inspires larger vision, broader intelligence and a more intensified individuality. Nor does all this measure the gift of irrigation in the highest standards; with irrigation has

developed the highest standards of equity and law, the clearest ethical conceptions, the soundest sense of relative value to be found among men. Consequently, while the area is broad and the acres are many with which irrigation has enriched our country, the other gifts of irrigation are still greater, for it has given us new and better standards, industrial, social, legal, mental, moral, and the perfect apple and luscious peach of the irrigated orchards, admirable as they are in themselves, may fitly be regarded as nothing more than symbols of the more elevated standards of human life traceable, after all, to the real gift of irrigation to humanity.

Among the important questions to be considered by the irrigationists at the present time is that of putting the settler on the land. It is estimated that the once arid sections of the western states now have nine million acres

Carrying the irrigation furrows in semi-circles around the trees. (Photographed near Auburn, California).

under irrigation awaiting settlers. Dr. Samuel Fortier, chief of irrigation investigations in the United States Department of Agriculture, states: "Taking the last irrigation census, the government found that twelve million acres had been provided with water but were not reclaimed for lack of farmers. A portion of this represents farms that have been partly put under cultivation. Making allowance for this, I estimate there are nine million acres now awaiting settlers. It appears to be the greatest problem of the west at the present time. We do not need more irrigation projects. Every effort should now be put forth in bringing in the right kind of settlers in order that the capital invested in irrigation may be rendered secure."

Colonization will be one of the important topics at the Calgary meeting. Our water resources are our most important assets and it is fitting that they should be discussed by such a congress as this and the one to be held in October in Calgary. The problem of the settler on the land will receive attention.

The farmer will have ample opportunity to be heard. The technical side of irrigation, the storing of floods, the measurement of streams, the scientific investigation of irrigation projects, the putting of the water on the land, will be emphasized. The work of the Irrigation Congress for the enactment of more practical and uniform state and national irrigation laws will be continued, and other improvements advocated. One day of the congress will be devoted to a trip free to delegates covering a 160-mile journey to the irrigation block lying to the east of Calgary and a visit of inspection to the Horseshoe Bend dam near Bassano which stores water for the largest individual irrigation project on this continent.

The twenty-first session of the International Irrigation Congress will well repay your attendance, and on behalf of the Calgary Board of Control, and the general officers of the congress, I have the greatest pleasure in extending to you all, and all those interested in the work of irrigation, a most cordial invitation to attend and be a delegate at the meeting in Calgary, October 5 to 9 next. Free discussion is an important feature of the congress and will be encouraged. The Irrigation Congress has accomplished much in the past; there remains more to be accomplished in the future, in carrying out its plans to "save the forests, store the floods, reclaim the deserts, make homes on the land." (Applause.)

CHAIRMAN: Mr. McCoy, the President of the Aquatic Club, and manager of the local branch of the Bank of Hamilton and, incidentally, according to the words of His Worship the Reeve, the future president of the bank, has an announcement to make.

MR. MCCOY: Ladies and gentlemen,—On behalf of the directors of the Aquatic Club, I have great pleasure in extending to you a warm invitation to avail yourselves of the advantages of the club-house during your visit to Penticton. It is situated on the lake front, almost opposite the Incola Hotel. We are holding our annual regatta on Tuesday afternoon, commencing at two o'clock sharp. In the evening the prizes will be presented and, following that, there will be a purely informal dance. An orchestra will be in attendance and we hope the ladies who have accompanied the delegates will be with us.

CHAIRMAN: The secretary has a few expressions of regret to read, and has also an announcement to make.

SECRETARY: I have some letters of regret and some war bulletins, and in order that you may stay, I will read the letters first and the war bulletins afterwards.

The following letters were then read:—

VICTORIA, July 17, 1914.

EDGAR V. DYNES, Esq.,
Secretary, Penticton Board of Trade,
Penticton, B.C.

DEAR MR. DYNES,—I am obliged for your invitation on behalf of the local committee to attend the convention of the Western Canada Irrigation

Association. I can assure you that it was not through any lack of interest that I have not been able to attend any meetings of the Association, but you can well understand that my many public engagements frequently prevent me from taking advantage of such opportunities as you offer.

If at all possible I shall attend on the 17th of August, but I am quite unable to give you any definite idea at the present time.

With very best wishes,

I am, yours sincerely,

RICHARD McBRIDE.

(*Telegram*)

VICTORIA, B.C., August 16, 1914

NORMAN S. RANKIN, Esq.,
Secretary, Western Canada Irrign. Assn.,
Penticton, B.C.

Please extend to officers and members present my regrets my inability be present at this session. Have several urgent engagements during next few days which are unavoidable. Please express my warmest hope that present session may be most successfully held and that work performed may be most beneficial to all the interests involved.

W. R. ROSS,
Minister of Lands.

CALGARY, August 14, 1914.

NORMAN S. RANKIN, Esq.,
Calgary, Alta.

DEAR SIR,—I am writing to express my extreme regret at not being able to be present at the eighth annual convention of the Western Canada Irrigation Association, to be held in Penticton on the 17th, 18th, and 19th of this month.

Up to a few weeks ago, I had fully intended to be present, but a number of emergent circumstances arising out of the present unforeseen war conditions, prohibit my making the trip.

The work that the Western Canada Irrigation Association has been doing for a number of years is of great value to the irrigation interests of Western Canada, and one that every agricultural community should support, and I am hopeful that this present convention, although held under very trying and distressing circumstances, will prove to be a fruitful and helpful one. It is, of course, recognized that, notwithstanding the war and its terrible results, agricultural and irrigation interests must of necessity be carefully looked after; in fact, more earnestly at the present moment than ever before—for the country must live—and we must therefore help the farmer, both as an individual and as a community in all possible ways.

Again expressing sincere regrets at my inability to be present, and with all kind wishes for the success of the convention, believe me to be,

Yours very truly,

J. S. DENNIS,
Assistant to the President.

LETHBRIDGE, Alta., August 14, 1914.

DEAR MR. RANKIN,—I had been promising myself the pleasure and instruction to be gathered from attending your convention, but some business has arisen that requires my preseence in Lethbridge just at this juncture.

I hope you will have a very successful time.

Yours sincerely,

G. A. MARNOCH,
President, Board of Trade.

CALGARY, August 14, 1914,
Active Service Assembly Quarters,
4th Field Troop, C.E.

The Secretary, W.C.I.A.

DEAR MR. RANKIN,—I much regret to say that under the present conditions my duties as an officer of the Active Militia of Canada will make it impossible for me to attend the convention at Penticton.

On account of my very great interest in irrigation matters and my anticipation of meeting so many old friends at Penticton, I had been looking forward to the convention with a great deal of pleasure, but my military duties are imperative.

Please express my great regret to the president and delegates at the convention and wishing you a very successful meeting,

Yours very truly,

F. H. PETERS.

SILVER LAKE, Utah, July 26, 1914.

DEAR MR. RANKIN,—I can only repeat what I wrote to Mr. Dennis, that I cannot now see my way clear to visit Canada during the Penticton congress—which I regret exceedingly.

Success to you, with anticipations of meeting you personally and of acquiring a wider acquaintanceship in your splendid province, I am

Yours respectfully,

RICHARD W. YOUNG.

(*Telegram*)

CALGARY, Alta., August 17, 1914.

NORMAN S. RANKIN,
Penticton, B.C.

Regret through illness unable to attend convention. Wish every success.

A. E. CROSS.

REGINA, July 16, 1914.

J. S. DENNIS, Esq.,
Chairman, Executive Committee, W.C.I.A.,
Calgary, Alta.

DEAR MR. DENNIS,—I am in receipt of your favour of the 9th instant and have to thank you for your very cordial invitation to be present at your Annual Irrigation Convention to be held at Penticton from August 17 to 19.

Replying, I may say that I have been so laid up with an attack of sciatica that I feel I would not be warranted in making any further engagements until my indisposition is removed.

I would like to be present at your convention but, in view of the circumstances above referred to, I scarcely think it possible that I will be able to be with you.

Regretting this, and trusting that your convention may be a successful and profitable one, I remain,

Yours very truly,

W. R. MOTHERWELL,
Minister of Agriculture.

THE "TIMBERMAN,"
PORTLAND, Oregon, July 18, 1914.

MY DEAR RANKIN,—I want to thank you for your favour of July 17 inviting me to be present at your association meeting which will hold its eighth annual convention August 17, 18, and 19. I would have been glad to have been with you, but I am in the throes of our Logging Congress, which will hold its sixth annual session at Bellingham, Wash., August 27, 28, and 29.

All I can say is, "God bless you and God-speed." I shall make a note in this issue of the *Timberman* of your convention.

With my best wishes, I ever am

Yours very truly,

G. M. CORNWALL,
Publisher.

MAPLE CREEK, Sask., August 15, 1914.

NORMAN S. RANKIN, Esq.,
Penticton, B.C.

DEAR SIR, AND GENTLEMEN,—I regret very much that I cannot be with you, but circumstances which I have no control over prevent me from being present. I take this opportunity of drawing your attention to the fact that this season has brought it more convincingly to our notice that we require storage reservoirs, as there was a large quantity of water in our creeks in the early spring, but when required had run to waste, and therefore we had no crops, as we had no rain anywhere. Where there was a little water to be had, there was added proof that it paid to irrigate.

Wishing you every success, I remain

Yours very sincerely,

R. G. WILLIAMSON,
President, Cypress Hills Water Users' Association.

FORESTRY BRANCH, OTTAWA, August 13, 1914.

The Secreatry,
Western Canada I.A.,
Penticton, B.C.

SIR,—In the absence of Mr. Campbell I beg to acknowledge receipt of your post card announcement of the Irrigation Convention to be held on August 17, 18, and 19. As Mr. Campbell is in Europe at the present time, it will not be possible for him to attend the convention.

Your obedient servant,

T. W. DWIGHT,
For Director.

The Secretary then read the first of a series of war bulletins, the despatch of which he had arranged for daily direct to the convention from Calgary, and these were much appreciated during the course of the sessions.

CHAIRMAN: This concludes our morning programme, with the exception that we have to appoint two committees, one to deal with resolutions, and the other with credentials. As a Committee on Credentials, I will appoint Messrs E. Foley-Bennett, Penticton; W. J. Lloyd, Lethbridge; and R. C. Pegler Bassano; Mr. Foley-Bennett being chairman.

Irrigating a walnut orchard by furrows with water delivered through underground concrete pipes and galvanized iron troughs. (Photographed near San Jose, California).

As a Committee on Resolutions, I will appoint Messrs. William Pearce, Calgary; C. W. Dickson, Kelowna, Walter Huckvale, Medicine Hat; A. Chamberlain, Kamloops; and H. C. Dufresne, Penticton; Mr. Pearce being chairman.

The Committee on Resolutions will meet for a moment immediately after the session in the room to the right.

The convention is now adjourned until two o'clock this afternoon.

AFTERNOON SESSION, AUGUST 17, 1914, 2 p.m.

CHAIRMAN: The meeting will please come to order. As in the past in our previous conventions, we wish to have as much discussion from the floor as possible. After each paper, as much time as possible will be left for discussion. We have certain rules regarding that in our constitution, and I will ask the local secretary, Mr. Dynes, to read the more important ones.

Mr. Dynes then read section 4 and 8 of the constitution.

CHAIRMAN: The secretary is just in receipt of a letter from Mr. Drake, Superintendent of Irrigation for the Dominion. This is written from Medicine Hat.

The permanent secretary then read the following letter:

MEDICINE HAT, August 14, 1914.

DEAR Mr. RANKIN,—I very much regret that urgent business prevents me from attending the convention this year. I know that a number of others who had planned attending have been similarly prevented, but I trust that there will be a good attendance notwithstanding and that the convention may be at least as useful and interesting as in previous years.

Sincerely,

E. F. DRAKE,
Supt. of Irrigation.

Orange orchard prepared for irrigation by means of 4 deep furrows. (Photographed near Glendora, California).

CHAIRMAN: The chairman of the Committee on Resolutions has asked me to request that if any other delegates wish to present resolutions, they should be handed in at once. I also announce a meeting of the Committee on Resolutions immediately following the adjournment of the general meeting.

The first paper this afternoon will be an address by Mr. S. G. Porter, of the Department of the Interior, Calgary, Alberta, on the following subject:

THE PRACTICAL OPERATION OF IRRIGATION WORKS.

Mr. S. G. PORTER: Mr. Chairman, ladies and gentlemen,—It is my desire in this brief discussion to bring out a few points of practical value to those interested in irrigation as an everyday bread-and-butter affair. As the title implies, I shall confine myself to practical matters, and not indulge in theories. I do not even expect to be able to say anything that is new to those who have seriously studied or practised irrigation. I therefore find myself hampered with the obvious difficulty of presenting thoughts which you may well consider trite and threadbare. But after all, a review of some of the facts which are familiar but which may have been neglected, or have failed to impress us with their importance, may be helpful. I trust that it will be so in this case,

There are naturally two points of view for the consideration of this subject: that of the manager of the irrigation system, and that of the water user or irrigation farmer. Each has problems peculiar to itself, and yet their interests are so nearly identical that the success of the one is essential to the well-being of the other. It must be remembered by the management that the operation of the canal is not an end in itself, but is solely for the benefit of the users. To so operate the canal that the farmers will reap the greatest possible benefits from the use of the water is the main purpose of the management. In so doing it will likewise best serve itself. There are certain well-known qualities which the man in charge of the operation of a canal should possess, such as business ability, tact, a practical knowledge of irrigation and agriculture, an ability and readiness to appreciate the farmer's point of view and his difficulties, a knowledge of human nature, fairness and firmness in administering his duties. The exercise of these qualities will determine his success, whether he is a ditch rider, distributing water from a lateral, or is the superintendent or manager of a big system. A high standard is required, and unless it is maintained, troubles will multiply.

Of the problems which must be met in the operation of irrigation canals, those involving the human element are far more difficult than the physical ones. The people under the canal are of every religious belief and political following. There is no uniformity in ideals or in habits of thought. In all honesty and sincerity, therefore, they misunderstand and are misunderstood. Often the seeds of future misunderstanding are sown by the agent who induces them to buy irrigated land by painting entirely too optimistic a picture in which the rich returns are magnified and the labour necessary to secure them is minimized. Disappointment follows disillusionment; and the disappointed man is always a hard man to deal with. Thus the human or social problem is a complex one.

These conditions, while they make more difficult, do not lessen the importance of co-operation between the management and the users. Co-operation must be obtained, or the result is suicidal. And it can only be obtained through the exercise of good sense and fairness on both sides. The company which attempts to enforce arbitrary, imperialistic methods without due consideration of the varied difficulties which the irrigator must meet, will not receive, nor will it merit, the helpful co-operation of the water users. It is necessary to have rules and restrictions, and the larger the system the greater the necessity, but such a schedule must be so flexible that it is the servant and not the master of the management.

Watering the spaces in the tree rows by off-sets in the furrows nearest the rows. (Photographed near San Dimas, California).

On the other hand, the farmer who does not recognize the rights of his neighbours as being of equal weight with his own, and who always expects the company to grant him some special concession which it cannot consistently extend to all, is a hindrance to harmonious co-operation. A recognition of the rights of others is the fundamental basis of co-operation in irrigation, just as it is in citizenship. Neither business nor government can succeed without it. It is absolutely necessary to exercise authority in both cases. In its exercise, fairness must prevail. Yet the very competency which comes through fairness and firmness invites antagonism from those who are selfishly inclined. It is as much the duty of the users of irrigation water to recognize fairness and abide by rightfully exercised authority as it is of the management to administer it. The obligations are mutual.

Many irrigation systems are operated by the water users themselves. This has many advantages and should be the ultimate aim of all systems where the conditions for its establishment are favourable. It is impossible to inaugurate it during the early stages of the development of a project before the land is

fully settled and the water users have become somewhat acquainted with the problems of operation and the distribution of water. And then there nearly always follows a period of near chaos until the water users become educated or accustomed to the exercise of their newly acquired authority and have fought out among themselves their own various theories of management and have settled down to a recognition of the necessity of a central authority which shall be dependent upon, but, at the same time, superior to individual and local wishes. But after it has passed this stage of its history, the water users, as stockholders in their mutual company, will be better contented to abide by the authority which they have a voice in constituting. The responsibility of management has been shifted from a corporation to themselves, and with it the criticism and friction which prevent harmony. Grievances and dissatisfaction are inseparable from water distribution, but they are easier of adjustment between mutual users than between the users and a corporation.

This is not necessarily because corporation management is less fair or less efficient than management by the users themselves. Usually the reverse is true. But a prejudice exists in the minds of the people against big companies and corporations, and this makes it difficult to adjust the differences that arise. In nothing is the spirit of neighbourliness more needful than in the division of water, and there is no severer test of neighbourliness than the ability to agree on its division.

Co-operative systems are better adapted to small canals than large ones. On the small ones the interests are less varied, all the users are acquainted with each others needs, and the community spirit prevails. As the size of the project grows and the property interests to be protected increase and become more varied, the difficulties also increase. Jealousies between districts militate against efficiency and fair treatment. The matter of repairs can no longer be handled as a neighbourhood affair by the farmers themselves. The maintenance of a big system must be on a thoroughly organized business basis. The men in charge must know what to do and be prepared to do it quickly. Accidents are serious. They cannot be prevented altogether, but a well-organized staff under a strong central authority can reduce their dangers to a minimum. Since these things can usually be better achieved by a company than by an organization of farmers, it is doubtful if co-operative management is to be endorsed for large systems.

It is difficult to find a middle ground between corporation control and mutual control. A division of responsibility necessitates a division of authority, which inevitably leads to conflict. It is for this reason that water users' associations are so often disappointing. They have their place, and may be very useful and even necessary for promoting the interests of their members. But too often instead of giving their attention to problems of bettering their own conditions they cultivate an antagonism with the management, creating rather than reducing friction. This fault usually arises out of the ambition of certain self-appointed leaders to acquire for themselves greater power. It is not usually the direct fault of the farmers themselves, but grows out of their permitting the local politicians and men known for their much talking to gain control of their organization and working for their own selfish interests instead of the greatest

good of the community. The result is that the farmers are made to believe that the management is opposed to their interests, and they drift into an attitude of opposition which works harm both on themselves and on the management. Thus their organization, instead of being a medium through which their honest wishes and interests find expression and which gives strength to their demands upon which the management can act with the assurance of best serving the community, becomes a source of trouble and immensely increases and complicates the difficulties of operation and management. Sometimes the main canals are operated by the company, while the laterals and distribution system are operated by the farmers. In this case, the farmers under a lateral incorporate a stock company for its control, and the authority and responsibility of the company operating the main system ends when the water is delivered at the headgate of the lateral. This system has the advantage of giving the users a voice in the distribution of their water, and in educating them in the problems attending operation. It has been successful under proper conditions, but is not likely to succeed unless the land is farmed by its owners who are interested beyond one season's crops. Otherwise, maintenance will be neglected and even the operation will be indifferently administered. The modern tendency is towards retaining in a central organization, whether it be a corporation or a co-operative company, the control of the water distribution to the individual farm units. In this way, trained men, properly organized, look after the details of distribution, more consistent methods are followed, and the work accomplished with greater efficiency. Furthermore, it is in line with the modern idea of specializing in the division of labour, permitting the farmer to give his entire attention to irrigating without being burdened with the care of ditches outside his own farm.

Rotation of delivery is now practised almost everywhere in preference to the constant-flow method. The constant-flow method, where the irrigator always has the water at his command, is well adapted to large holdings, but even then it is of necessity rotated from one part of the holding to another and is not different essentially from rotation among small individual holdings. A small stream flowing constantly cannot be economically used. It is necessary to have a sufficient irrigation head to cover the ground quickly. Otherwise it will spread so slowly that the land near the ditch will receive too much, and that further away, not enough. Uniform distribution under such circumstances is impossible. Furthermore, it leaves no opportunity for proper cultivation between waterings.

One of the weaknesses of general irrigation practice has been the lack of proper records. So long as the supply was large enough to give everyone all he wanted and at the time he wanted it, there was no particular need for records. But in most districts, that time has passed. Proper measurements and records are a necessary part of a well-developed system of operation. They are the best answers in disputes over questions of equitable distribution. They are the best check on economy of use and prevention of waste. They are the only means of determining scientifically the proper duty of water and for securing the highest efficiency in its application. The irrigation management which, for the sake of economy, tries to get along without keeping records is practising the same kind

of economy as the merchant who tries to run his business without keeping books. Neither is able to tell whether he is expending his capital wisely.

For purposes of comparison, and for arriving at recognized standards, uniformity of methods of operation, records and reports among irrigation enterprises would be immensely useful. Irrigation practice in this country is yet in its pioneer stage, and has not crystallized into customs and standards.

Terrace irrigation with water distributed in furrows. (Photographed near Highgrove, California).

Much has been done in this direction in the past few years by the United States Reclamation Service, but the co-operation of private as well as government enterprises is needed.

The operation of irrigation works is concerned, not merely in carrying water through canals and delivering it to the farmers, but also in its proper application. It is no small part of the duty of the operation organization to study the needs of the soil and of the crops grown, and to give scientific instruction and assistance to the farmers it serves.

It is likewise the part of wisdom on the farmer's part to avail himself of every opportunity to improve his methods in the application of water and the care of his crops. It is along this line that I wish to appeal to the farmer members of this convention.

I wish every one of you would read the results of Don Bark's work in Idaho. He deserves the thanks of every irrigationist on the continent. He has shown very forcibly and in a very practical way, the effects from different methods of watering. One of the strong points is the bad effect of using too much water. It not only means a waste of water, but a positive injury to both the crop and the soil. Excessive waste is often accomplished by trying to run the water across the field too far. It is not uncommon to see a farmer trying to spread water across a 40-acre field from one head ditch. In doing so he gives the upper

part of his field three or four times as much water as it requires before the water reaches the lower side. It is obvious that the waste is immense. I show here a diagram from one of my own reports on water distribution under one of the large canals of Colorado. The results shown are based partially on careful estimates, taking into consideration average conditions. The case is not exaggerated. You will note that the water efficiency of the system is only 28 per cent. That would certainly be deemed a very poor showing in any other business; in fact it is a poor showing in irrigation, but, as I said, it is not uncommon.

Let us take this as a typical case and analyse it. The main canal has a carrying capacity of 800 second-feet, and is 80 miles long. It is fairly well built and has been in operation about twenty years. The soil is fairly heavy

Young orchard set out and being irrigated on contours. (Photographed near Riverside, California).

sandy loam. You will note that the loss in the main canal is 25 per cent. While its total length is 80 miles, its length from the intake to the centre of distribution is 50 miles. The losses therefore average one-half of 1 per cent per mile. The loss in the distributaries between the main canal and the farmers' deliveries amounts to 25 per cent of the amount delivered to the laterals, or to 19 per cent of the total taken into the main canal.

These losses, which are common to all canals built in ordinary earth, can be reduced to a negligible quantity, when the value of the water reaches the point where it will justify lining the canals or piping the water. This condition exists only in a small proportion of cases.

The next losses shown are the ones I want to call to the special attention of the irrigators present. These are the field losses, and are divided into three kinds: surface, run-off, field evaporation and deep percolation.

The field surface run-off is largely under the control of the irrigator. Its amount depends upon the skill of the irrigator, the preparation of the field

ditches and the land, and the method of handling the water. It is of great importance to locate and construct the farm ditches in a manner suited to the topography, the soil, and the crop grown. And it is of equal importance to have the ground properly levelled and prepared. The average loss by surface run-off amounts to not less than 10 per cent of the water delivered to the farm.

Field evaporation amounts to an average of 20 per cent of the water delivered to the farm. It can be materially reduced by using deep furrows or by properly tilling the soil after the application of water.

An additional 20 per cent of the amount delivered to the farm is usually lost by deep percolation beyond the reach of plant roots. This loss may be immensely more on sandy or gravelly soils, where the water is spread a long distance between cross ditches. In clay soils, or in short runs, it will be less. This loss can be largely controlled by regulating the size of the irrigating head and the length of the run. Probably three-quarters of it can be avoided by adopting scientific principles of irrigation.

These three field losses, then, under conditions that ordinarily prevail amount to 50 per cent of the water delivered to the farm, or to 28 per cent of the amount taken into the main canal leaving only 28 per cent to be utilized for plant growth. In other words, an average of less than one-third of the water diverted from the streams is utilized for plant nourishment. The rest is wasted in one way or another.

I wish to emphasize one other point in the application of water, that is the importance of applying it at the right time. This is illustrated by the second chart which shows the results from four fields of wheat which came under the observations of an official of the Department of the Interior in the Duty of Water Investigations, near Lethbridge, last year.

The fields are near each other, and the conditions, other than the application of water, were similar. In the upper part of the diagram, the daily rainfall is shown to scale. It will be noted that from the 13th of May to the 19th of June, a period of five weeks, there was almost no rainfall. Field No. 1 was irrigated the first week in June, before it began to suffer from the drought, and it yielded 31 bushels per acre. Field No. 2 waited ten days longer and yielded 26 bushels. Field No. 3 was not irrigated until the 17th of June, or just at the time the rains began. It yielded 19 bushels. Field No. 4 was not irrigated at all, and produced 15 bushels.

In a climate with a short growing season, it is important that crops be urged along and not permitted to have a setback and then be given a second growth. Such conditions will not only reduce the yield but are likely to prolong the growth too late for it to reach maturity. The illustration shows that field No. 1 irrigated at the proper time, not only produced more than double the yield, but matured just as early as the non-irrigated field, while those which were irrigated later, matured later and yielded less than the first.

Success in irrigation depends upon getting water at the right time, in the proper amount, and applying it in the proper way. Not to meet these conditions will mean a loss anywhere from a few dollars to perhaps a hundred dollars per acre in crop returns. The responsibility then is heavy on both sides, on the

operator and on the irrigator. It emphasizes the necessity of proper maintenance and able management on the part of the company as well as the use of scientific methods on the part of the farmer.

I am a strong believer in getting things down to a practical basis and have emphasized the practical side of this question as opposed to the technical or theoretical. But the word "practical" stands like a Chinese wall around some men, keeping out the benefits of adopting anything recommended by the scientist. Being practical, as they understand it, is doing things in the same good old way their grandfather did. A man with that conception of what is practical is most likely in these days to be a practical failure.

Irrigating an orchard with 3 contour furrows between each tree row. (Photographed near Porterville, California).

Someone has said "the hardest man to teach farming to is the farmer." So the hardest man to teach irrigation to is the irrigator. That is, the old irrigator, set in his ways—wrong ways—and unwilling to change them for newer, more scientific ones. Irrigation farming is a business, it is also a science. And it should profit by the methods of both the business man and the scientist. Don't let the exaggerated idea of your own practical methods stand in the way of your adopted better ones. They are not necessarily less practical because they are more scientific.

Don't depend for success entirely on hard work. Important as it is, it is a costly substitute for modern scientific methods. Proper methods are just as essential for success in your work as in the modern manufacturing plant.

The wise man profits not only by his own experience, but also by the experience of others. Your own experience is, of course, the most important. You should make it a matter of record for analysis and comparison, so that you will not continue to make the same mistakes over and over. That is what finally brings failure. But the new man need not be discouraged. He can go far with-

out personal experience if he knows how to utilize the experience of others. It is said that not more than 2 per cent of the farmers of the country take practical advantage of advanced scientific methods of soil and crop culture described and advocated in government bulletins and experimental station reports, distributed free by the Canadian and United States Governments.

My appeal to you is to avail yourselves of the assistance that is offered for improving your conditions and increasing your returns. (Applause.)

CHAIRMAN: If there is no discussion, we will proceed to the next address on the programme. I may say that on account of several not being able to be present, the three addresses given in the printed programme have to be changed. We expect, however, that the absentees will be present tomorrow.

We will now listen to Mr. C. L. Smith, Agriculturist with the O.W.R. & N. Company, Portland, Oregon, his subject being

LIVE STOCK AND MIXED FARMING.

Mr. C. L. SMITH: Mr. Chairman, ladies and gentlemen,—What I have to say on the subject of diversified farming in this paper, has reference to the man who lives on the land, who is striving to provide a home and home comforts for himself and family through the application of his labour and the intelligence use of his land.

For more than forty years I have been a student of farm life, and I have had exceptional opportunities for observation and investigation under varying conditions. I am familiar with all the struggles, hardships, and deprivations of pioneer life; not alone from observation and investigation, but from personal experience. The lack of adequate working capital, bad market conditions, drouths, storms, insect pests, frosts too late in the spring or too early in the fall, and yet in spite of all the handicaps, I hold this fact as absolutely true; that the individual who desires to make for himself and family a home with home comforts, who must provide these things by the labour of hand and heart, can secure a larger measure of the necessities and comforts of life in the care and cultivation of a small farm, than a like amount of thought and labour will secure anywhere else.

Compared with the life of a wage-earner in the city, the opportunities and advantages of the small farmer are in every way preferable. The same amount of labour will provide a much better house, better food, with better air and more agreeable surroundings. He does not have to obey the orders of the boss, nor the rules of the union. He is not afraid of losing his job. His eggs are fresh, his milk unskimmed, his fruit and vegetables are fresh from the tree or vine. He is not ambitious for wealth, does not venture into some schemes to get rich quickly. He can be independent of business conditions, financial crises, or other factors that vex the average wage-earner.

An important factor, contributing to success anywhere, east or west, north or south, on the irrigated tract, the dry farm, or in districts with abundant rainfall, is the dairy cow, which ranks first, with the pig and the hen as valuable allies.

Deputy Minister of Agriculture, W. E. Scott, wearing the "smile that won't come off".

In the first address I ever made before a Farmers Institute, over thirty years ago, I argued for a diversified system of agriculture; this for the reason that my experience and observations had emphasized the fact that where a diversified system of farming was carried on with the cow, the pig, the hen, and the garden as important factors, I found better homes, better home conditions, better food on the table, better, healthier, happier families, less debts, and less fault finding with conditions.

One of the conclusions formed from a careful study of conditions, and a study of results, is that the owner of a small farm, who places home making ahead of mere money making, is nearly always successful, while the man who is striving always for money, that is concentrating thought and energy only on the production of something that is to be exchanged for cash, is in most instances a failure.

By "diversified farming" I do not mean a haphazard scattering of resources, effort, and opportunities; the system of farming to be followed must depend upon a great variety of factors, and the measure of success achieved will always be modified by the adaption of these factors to each other, the taste, the energy, the ability of the individual. As a rule, the largest measure of success will be secured where there is some one thing selected as a leader, with such diversity along other lines as to cause continuous labour, with fairly continuous income. The selection of a crop leader must be determined by the taste of the individual, the distance from the market, the character of the soil, the labour available, working capital, and whether or not the land is irrigated.

The waste of time, energy, opportunity, and resources through negligence, carelessness, and ignorance is appalling. This is especially true of localities where land is cheap and scarcity of labour obtains. It is a well recognized fact that where such conditions exist, every one wants to sell out. I am often asked: "What can we do to attract settlers and capital." My answer is: "Make better use of your resources, do better farming, get more live stock, give them better care, clean up your door yards, farm less land, bur farm it better."

Those who have studied the problems of developing the magnificent resources of the Pacific Northwest, realize that the development of these resources depend primarily upon the man on the land. It is more important that he should succeed, that he should intelligently utilize his labour, his land, and his capital, than it is to get more men here. If those already on the land make good, others will come.

I am employed by the Oregon, Washington Railroad and Navigation Company to devote my time and energy to the improvement of conditions among the farmers in the country served by the railway lines. I am frequently asked the question: "Why is the railway interested in improving the condition of the farmers"

The traffic managers of our large transportation companies have long realized that any section of the country devoted to a single crop system in farming, has an unreliable and unsatisfactory source of revenue. Statistics prepared by them demonstrate that the largest volume of business comes from districts where a diversified system of farming is carried on, and that this business is more equally divided through the year, and can therefore be carried on more economically and satisfactorily. It is also a recognized fact that only a small percentage

of the productive capacity of any given section has yet been fully developed. Any increase of business must necessarily come from the development of these latent resources, and that is where the railway comes in.

There are three directions to which we may look for future development: First, the clearing and bringing under cultivation of logged-off lands; second, the increase of irrigated areas by the use of storage reservoirs and pumping plants; third, and most important is the breaking up of large holdings, already under cultivation in large farms, into smaller farms. This necessarily means more people on the land, more profitable and continuous employment of labour, more intensive methods of cultivation, more and better live stock, more business for the merchant, the banker, the manufacturer, and the transportation companies.

I visit the farmers in their homes, study their methods, compare results, make suggestions for improvements, encourage the interest in live stock, and urge a greater diversity of crops and a more intensive cultivation of the soil. A few years ago, in the irrigated valleys, there were just two lines of production, alfalfa and apples; and in the dry farming section, wheat on summer-fallow land. We inaugurated a campaign for diversified farming, ran demonstration trains, delivered lectures, distributed literature, held farmers' meetings in the school-houses, distributed seed, visited the farmers on their farms, and induced them to try experiments. The results have been very gratifying. The people along our lines are raising even more wheat and more apples, and have added thereto hogs and cattle, butter and eggs. They are growing corn to balance alfalfa in dairying and beef-making, building silos, growing peas, corn and other crops instead of bare summer-fallow.

One of the largest alfalfa growers in the Yakima valley last year ploughed up 50 acres of old alfalfa land and raised 4,000 bushels of corn. Another man ploughed up 3 acres of alfalfa, covered the sod with cow manure, and raised 100 tons of corn silage on the 3 acres. He raised the entire feed for a herd of 25 cows on 20 acres of irrigated land, and sells $3,000 worth of cream a year.

In one irrigated district they have 1,400 acres of corn and 800 acres of field peas growing between the rows of young apple trees. All this will be fed to the hogs and cattle, and the manure returned to the orchards. In the Hood River district they are building a co-operative creamery. In every irrigated district reached by our lines, the acreage of corn, the number of cows, of silos, of pigs, and of poultry is steadily increasing.

At the recent irrigation congress in Denver, the danger and disadvantage of a single crop system was well illustrated by one of the speakers, who said: "In our districts the units are 160 acres and acting under the advice of experts, we have seeded the whole to alfalfa. We have three years crop on hand, there is no market for hay—we have no cattle to eat it—we are behind in our payments —we have no title to our land—we cannot borrow money to buy live stock—the Government will have to come to our assistance or we will have to abandon our claims." He closed with an eloquent plea for a system of rural credits. In the discussion that followed, I pointed out the mistake of a single-crop system, and closed with the statement that I had always found the best pioneers on any project of this kind were the cow, the pig, and the hen, and that together

or seperate they would beat any loan company on the face of the earth, no matter how low the rate of interest.

On the question of fertilization, which is conceded to be one of the most important confronting the irrigator of the present day, I would say that the maintenance of the necessary amount of plant food in the soil is one of the necessary factors in the production of choice fruit, vegetables, grains, or forage crops. The largest percentage of profit is unfairly secured by the method that secures the best quality and the largest yields. The history of agriculture for hundreds of years indicates that the most satisfactory, the most lasting, and the most reliable method of maintaining or increasing the fertility of the soil is to make live stock in some form or other an important factor in the system—to produce an abundance of forage to be fed to such stock on the farm—not sold, and to intelligently apply the manure from the herd to the land. We have also learned that as soon as stable manure is made it should be mixed with the soil to secure the best results. It is also a well-recognized fact that certain crops take different elements from the soil, and that many of them leave elements in the soil that are poisonous to themselves, but food for other plants. Therefore crop rotation has a tendency to improve the yield and quality.

Nearly all the soils in the irrigated areas are deficient in organic matter. The addition of this organic matter increases the amount of available plant food. The moisture-holding capacity of the soil and the facilities of irrigation are dependent on each other. The best known method of increasing organic matter in the soil is by the application of stable manure. Next to this is the use of cover crops; but the poor man who depends upon his land and labour to provide himself with the necessaries of life, cannot afford to grow cover crops to plow under. He can afford to grow clover, peas, rye, vetch, and corn, however, and feed them to cows, calves, and pigs, and put the manure back into the soil.

One of the reasons why a diversified system of farming is made advantageous for the man who does his own work, is the fact that it more equitably divides the labour throughout the year. As an illustration: In a meeting of one of the big irrigation projects where many of the members only held 10 acres, I urged them never to plant more than one-half their tract with one crop, to grow at least an acre of corn, to keep at least one cow, one hundred to two hundred hens, and a good brood sow, and to arrange a system of cropping that would divide the labour over the entire season. One of the crops discussed was onions, a crop requiring much hand labour in May and June, and giving gross returns of from three to eight hundred dollars per acre. When discussing the cow proposition one young man asked:

"For how much could you buy the feed to sustain one cow for one year?" My answer was about $75.

"How much ground would it take to grow that much feed on?" he then asked. I replied, "About an acre."

"Then why not plant the land to onions and buy the cow feed?" said the young man.

I said: "Because you would not do it. One acre of onions is the most a man should grow, or attempt to grow, unless he expects to hire help."

Another advantage of diversity in farming is found in the fact that in some seasons certain crops will prove a partial or total failure. This is particularly true of certain perishable crops like onions and potatoes, which some seasons do not realize sufficient money to pay for marketing. The man who has only potatoes and onions that year is in hard luck. In this connection I want to say, that when I find a man anywhere who has a given acreage of potatoes every year, and stays with it year after year, he is always well to the good for a term of five to ten years.

On the other hand the producer who grows more of any perishable product than is sufficient to supply the immediate local demand will always be at a disadvantage in marketing that product unless he has enough to ship in carload lots, or can combine with others in the same locality to make up carload shipments. This emphasizes the necessity of local organizations and co-operation. The measure of success among producers in any locality with any line of produce is usually determined by the character of their local co-operative organizations. Such organizations can with reasonable accuracy determine some special crop for which the soil and climate in that particular locality is peculiarly adapted. By making that crop a leader, standardizing the product, establishing a reputation, adopting uniform grades and packages, a market can be found twenty-five to fifty per cent better than the average individual would be able to get. Even then the most successful are those who diversify. The most successful raspberry grower at Pullyap, Washington, where raspberries are the leader, keeps a dairy of twenty-five cows, has an acre of rhubarb, keeps a large flock of poultry, and has less than one-third of his land planted to raspberries.

An intelligent diversity not only tends to provide continuous and profitable employment, it provides something of interest to different members of the family. Give the boys something to do that is interesting and profitable and you have gone far toward the solution of the problem of keeping them on the farm. (Applause.)

CHAIRMAN: Now we are surely going to have a discussion.

MR. JAMES JOHNSTONE: I should like to ask Mr. Smith some questions because I believe every word he has said, having practised for nine years everything he has preached. I am also very fond of lamb chops, and last year I purchased some of the best registered sheep I could secure and thought I was going to be very happy, but some of my neighbours have been telling me not to allow the sheep to run in the orchards; that the grease from the wool will eventually kill that orchard. I don't believe it, but I simply wish to know if Mr. Smith has ever found anything of the kind. To avoid paralysis, I found that the best way was to keep the sheep fat. As far as damage to the trees was concerned, I found that they did far less damage than the pigs.

MR. SMITH: I do say that in all my experience I have never known of an instance where sheep did any damage to an orchard, either from grease or anything else. But I will say this, if you are running sheep in an orchard and find that they deposit grease against any particular tree, a very slight application of

lye will take that grease off readily and will not leave any bad effect. I doubt whether a few sheep running in an orchard at the rate of two or three sheep to the acre, would do any serious damage in the orchard; in fact, I think they would be a benefit. I have not found that practised very frequent, but I have found it and never yet found any bad results from it. You find that oftener in New England than out West here.

MR. TAYLOR: What about pigs in an orchard?

MR. SMITH: I have found that they are not harmful, provided they have rings in their noses. Another thing, the gentleman spoke about his sheep; he thought that if they were well fed he would have no trouble. Now, you will find that if you will provide charcoal salt for your pigs and feed them always so that they will come up lively to be fed at feeding time, they will never be hungry and squeal and annoy your neighbours. (Laughter.)

Dr. RUTHERFORD: I may say I think you can be perfectly easy concerning grease on trees. The grease on the wool of sheep is of a peculiar nature and it does not require lye to take it off, as ordinary water will take it off. Moreover, the sheep never rub unless itching from a parasitic disease, and dipping will do away with that.

Mr. JOHNSTONE: Thank you.

Mayor CONKLIN: I would like to give my experience regarding grease. I have had no experience with grease in an orchard, but I have had experience with willows on the prairies, which are a little tougher than fruit trees. There were quite a number of willows and they were supposed to be the greatest evil we had to get rid of, but in two years' time, while the sheep were running among them, every willow tree died, simply, I took it, through coming in contact with the grease on the sheep. It poisoned them right to the root, and it was easy to hitch on to them and draw them out to clear the land. So my impression is that if you put many sheep among your trees, it is almost certain that they will poison those trees.

Mr. SMITH: I may say that my judgment would be that those willows died from packing the ground so tight that the air was shut out, rather than from rubbing against them. Packing the ground very tight will ruin trees, and a tree in order to live must have air as well as moisture.

Mr. PEARCE: Don't you think the willows might have been killed by the sheep nipping off the young growth giving lungs to the tree?

Mayor CONKLIN: These willows were 20 feet high.

Mr. PEARCE: I do not think that would make any difference.

Hon. PRICE ELLISON: If there is anybody in this audience who wants trees trimmed well, up to 3 or 4 feet high, I have got the experience. The sheep got in by mistake last year and did great damage to 500 trees. My advice is to keep the sheep as far away from the orchard as you possibly can, for they trimmed the trees as clean as you could have done it with a knife.

Mr. TAYLOR: I have some sheep all the time in my orchard at the coast and, outside of nibbling a few branches as far as they could reach, I have never lost a single tree from rubbing. I don't believe in the theory of oil. In my district, it is quite common for people to keep sheep in an orchard, and I have seen very little nibbling of trees except one year when we had a very heavy snowfall.

Mr. JOHNSTONE: I may say I kept my sheep all last winter in the orchard and fed them all the good hay on it, and certainly they never touched a single tree.

Hon. PRICE ELLISON: How old was the orchard?

Mr. JOHNSTONE: They had the run of the whole place—8 years old and upwards. This year they have taken the leaves off the trees but did not touch the bark.

Mr. LLOYD: It is really a question of the age of the tree as to what damage is actually done. Young trees, from yearlings up to 5 or 6 years, would always be in danger, but when they are eight or 9 years of age, they are sufficiently developed to resist any outward injury that a few sheep would do. I think it all resolves itself on the age of the tree.

Mr. MUTCH: I don't think it is fair to saddle Mr. Smith with any of the discussion that has taken place in regard to sheep. Mr. Smith's argument was the advocacy of cows for the fruit growers, and I don't think there is a place on the American continent where Mr. Smith's address can be applied with more direct benefit than our community right here. (Hear, hear.) I was very pleased, indeed, to hear what Mr. Smith has had to say on the subject and my only regret is that we were not all aware that Mr. Smith was going to address us on this subject, so that we could have had all the fruit growers of our community here to hear that.

For the last two or three years, I have been advocating just along the lines of his discussion, but without any of the knowledge he was brought to bear on the subject. I had to gather as I went along. It would be news possibly to many of the men in this hall, that the majority of the men here are using canned milk and canned cream and case eggs purchased in the cities, in preference to growing them, simply because they have been specialized off the face of the earth by the advocates of the single-crop orchard. From the very first start of the settlement of Penticton, the whole cry has been fruit, fruit, fruit, without any of the sidelines that should go along with the fruit growing. I regret that I was not aware before of the nature of Mr. Smith's address so that I could have

gathered every man in the community who is interested in fruit growing, to hear what he has to say. I would like very much, if possible, to have Mr. Smith give us—not the same address, because I don't think he could—but, a similar address, and we will endeavour to get so many of our local people here to hear it and be benefited by it as we possibly can do. (Hear, hear.)

Mr SMITH: I will say this, any time you want to get a crowd together here or somewhere else, it does not make any difference, I will talk five minutes or five hours on the subject. (Laughter.)

CHAIRMAN: The next address on the programme is by Mr. William Young, Comptroller of Water Rights, British Columbia Government, the title of his address being

WATER ADMINISTRATION IN BRITISH COLUMBIA.

Mr. YOUNG: Mr. Chairman, ladies and gentlemen,— When the secretary of your Association wrote to me asking that I give this paper, he asked that I confine myself to twenty minutes. Now, there are probably a dozen aspects of the matter that would take all of that, so that I can give you only a few general remarks on the subject.

CHAIRMAN: The programme is such that if you find it more convenient, you may take a longer time.

Mr YOUNG: As the province has developed since 1900, and large undertakings were launched, whether in irrigation or land, development of power or construction of waterworks, it became more and more obvious that administration under the Water Clauses Act of 1897 was ineffective.

The Water Act of 1909, an attempt to overcome this ineffectiveness was good so far as it went, but the difficulties that arose from year to year necessitated the annual amendment until, I am told the Water Act became the joke of the session. Those, however, who have made a close study of water administration consider the amendments of 1913 and 1914 of far-reaching importance, for they not only provide that which the Act was lacking in, namely, administrative machinery, but created such order in the arrangement that now the procedure can be easily followed.

The Act of 1913 came in for much criticism, a great deal of it unmerited. Talk, however, is cheap and the opinions expressed would fill volumes. Improvement comes only through experience, and the Act of 1914 as it stands may be said to represent the effort of not only experience in British Columbia, not only the experience of many who have given a lifetime to water administration in America, but also the investigation of the water laws of the Empire. We do not claim that the Act is now perfect; conditions have arisen and will continue to arise that will, from time to time require addition and possibly amendment to meet them.

The purposes for which water rights may be acquired are fourteen in number, as set out in the beginning of the Act, and if you will read through the Act you will find that, of these, three purposes stand out with prominence:

1. Irrigation by individual, community, company, municipality or corporation.
2. Power.
3. Waterworks.

Around these the administrative machinery is being built,such machinery being capable of taking care of the remaining purposes, which are also important. A broad distinction in purposes, however, may be said to exist; purposes that affect the public interest and purposes that affect the individual. In the light of this we have the Water Rights Branch in a process of organization to effectively administer these great purposes in particular. Beginning March 1, 1913, each step taken has been retained but it will require time to complete if the best results are to obtain.

Investigation of conditions during 1912 showed conclusively that before water rights throughout the province, including the Railway Belt, could be administered with any satisfaction, old records, of which there were about 8,000 would require investigation and adjudication thereon. Although a Board of Investigation was provided under the Act of 1909, effective work was not accomplished until after the amendments of 1913, and the acceptance of the amended Railway Belt Water Act of the same year. If any success has resulted from the efforts of this tribunal during the last two seasons, it is as much as anything due to the fact that before a hearing was held, the board was in possession of engineers' reports and maps that set out the facts. These hearings were very different from those formerly held without such information. This work of making reports for the board since April 1, 1913, has taken fully nine-tenths of the time of our district engineers. This season will see it complete, so that now our staff is gradually working into the duties of administration in its several phases. Before I leave this matter of engineering investigation, I would like to mention that it means the preparation of 8,000 plans of various sizes, of which 2,000 are complete, and as respects the season of 1913, out of a budget for that year of $145,000, an expenditure of $90,000, the balance $55,000, less a surplus at the end of the year of $2.75, representing cost of administration.

Concurrent with the time the board was reorganized and its powers enlarged by the amending Act of 1913, the office of water commissioner, or comptroller, was confirmed with enlarged powers and to assist him, provision was made for the creation of districts and the appointment of engineers with specific powers.

With this basis established, what remained then was a system for administration that would be efficient and at the same time effective. Considerable progress has been made at the head office with a system particularly adapted for the business of administration. District offices have been opened, which with the specific powers conferred on district engineers, have in many districts proven of assistance to water applicants and users, and that there might be uniformity of effort, an order of work was adopted comprising eight different lines:—

Systematic and continuous work in stream gauging.
Study of the proper duty of water.
The prevention of wasteful use of water.
Policing of streams.
Economic distribution and delivery of water.
Inspecting water systems to determine their efficiency and safety.
Determination of storage possibilities.
Investigation of water powers.

As already stated, practically nine-tenths of the time of the district engineers and field forces have been taken up with investigation of old records and in the circumstances the administration of water under the several heads could not be carried out during 1913 in the manner we would have liked. Now that this special work is about finished, the main work is gradually being taken up and already considerable has been done in one or other of the lines mentioned.

You will note that this order of work involves the three great purposes referred to, which are of greater or less importance according to the district. In this district that which is of greatest importance is irrigation, although other purposes have their place.

IRRIGATION.

Administration of water for irrigation is undoubtedly the most complicated. Prior to the Act of 1914 there was no provision that would enable the officers to cope with conditions that existed, and in the circumstances their hands were practically tied. The Act of 1914 included new sections which comprise the basic principles that make administration possible. These are as follows:—

"Limiting the quantity to beneficial use." that is to say: the quantity of water used per acre shall be limited to such quantity as experience may from time to time indicate to be necessary for the production of crops in the exercise of good husbandry.

"Rotation in use," when a number of water users may arrange a system of rotation that will best meet the requirements of growing crops and at the same time secure an economic use of water.

"Consideration of the particular crop grown," a provision which opens the way for adjustment that is in the interest of a community as a whole.

It is not the intention to take up your time here in an argument on what kind of crops should be grown; for example whether a man should grow timothy and attempt a second crop, or grow alfalfa securing several crops and with greater economy of water. I do not consider myself qualified to discuss such an important subject, but as respects these principles and their administration, I am reminded of a statement of Sir William Willcock's in reference to control of use of water in the prevention of deterioration of the land, as follows:—

"In this respect the Government is autocratic, and can and must enforce the regulations devised by its experienced advisers. It need not await the slow education of the great body of water users before adopting those practices which experience has shown are neceassry for the general prosperity."

For the administration of these principles, the powers of the district engineers were enlarged and in carrying out any rotation of water, they may arrange, when necessary for the appointment of water bailiffs whose duties and authority are clearly set out in the Act that there may be no minunderstandings.

Then there are other important features that permit of effective administration and enable organization that will mean not only development, but co-operation among farmers: These are

Water users communities with or without limited liability.
Mutual water companies.
Public irrigation companies.

Time will not permit of reference to these, other than to state that, with those basic principles that make administration of water for irrigation possible, they are the reply of the Government to the resolutions passed at previous conventions of this Association held in British Columbia.

POWER.

The administration of power; This purpose and its administrative requirements has received quite as much consideration as the purpose of irrigation. Recent amendments to the Act in this respect were few, but of great importance. It is no longer possible for a company to organize with the minimum of capital permissible in the Companies' Act for an undertaking requiring several millions of dollars for construction. Administration in the long run is now simplified by making it impossible for a speculative element to secure and hold a valuable franchise, and since the purpose of "Power" is governed by the rules and regulations that provide not only for construction within a reasonable time but regulation during the time of operation.

The chief work of the power administration begins with the operation period. For the present the determination of fees to be charged is occupying our attention. Under the rules and regulations they may be based on reasonable station output. This year we are taking this as the average daily horse-power arrived at from the total annual output in kilowatt hours at the power-house switchboard.

Hydro-electric power, however, is a specialty and we will in due course have a section of our staff devoting its whole time to its administration and study. As respects the latter, the problem that is of economic importance is "to what extent should the Crown become interested." We have the example of the Ontario Hydro-electric, the progress of which we must follow, analysing reports and criticisms pro and con. And there is the other side, the principle that all public utilities as natural monopolies be placed under regulation by the Crown.

The work of investigation of water-powers will include all streams that promise power, be they small or large. The value of the small powers cannot be overestimated; their investigation will be thorough as reliable data on a small power which may mean to some community in its vicinity, the establishment of an important industry.

WATERWORKS.

The third great purpose to which I have referred as being of public interest is waterworks. There are some here who have lived in eastern cities and came through a scourge or two of typhoid. To you the importance of proper administration cannot be over-estimated. Aside from the general office work in the issue of licenses, we have kept an engineer and party investigating watersheds from which domestic water is drawn by centres of population. The order of work is:

Determination of drainage area.
Extent of run-off or systematic stream gauging.
Timber cruising to determine how much is merchantable and whether or not the timber as a whole is a factor in the regulation of stream flow.
Alienated timber.
Alienated land: the purpose for which it is held.
Other rights whether water or mineral and the use to which such are being put.

The value of the results to be obtained from this work must become of greater importance from year to year, and with the co-operation of an active Provincial Board of Health there should be available for the various centres of population, data that will be a guide in securing and guarding sources of pure domestic water.

CONCLUSION.

I have referred to the duties of the district engineers as covering those great purposes. It must be obvious to you that it will be impossible for them to give every line of work laid down the attention it merits. For example, take "duty of water," a work that will demand the whole time of one man who must specialize in it. It is not the intention that the district engineers shall be relieved of responsibility here; on the contrary their co-operation is essential. Then again there is special work arising in the formation of irrigation corporations, a work on which the Board of Investigation and the comptroller and staff have a joint responsibility and although the prospective corporations now before us are being dealt with, a qualified man must be placed in charge of some phases of it. The administration of power and waterworks require similar treatment, and what about stream gauging?

When the province took over from the Dominion the administration of water rights in the Railway Belt, the latter decided to continue on with its hydrographic survey. It was considered that it would be advantageous to the province if it could co-operate with the Dominion along lines similar to those in operation in the United States. An agreement was accordingly arrived at, and so we have the British Columbia Hydrographers who are now gauging all the important streams south of the Railway Belt. These men have no administrative powers in respect of water rights, they are simply observers and recorders of stream flow and run-off from year to year over periods that will give complete cycles for each stream. Our district engineers are to an extent relieved of this

work, except in sections where irrigation is practised and administration directly depends on it.

Now, it may appear to some that since the procedure in acquiring water rights is fixed by law, officers empowered to issue and administer rules and regulations approved of by the Lieutenant-Governor in Council for carrying out the spirit, intent, meaning and purpose of the Act, and an order of work laid down, all that is expected of the officials is that they carry on the work as systemtized. There is, however, a larger sphere that can only be appreciated by a vision of what British Columbia might be if its population was four million instead of 400,000. If the administration of water rights is to count for anything, the requirements of the different sections of the country must be anticipated. If this valley is to develop, hydrographic and topographic surveys are as necessary as land surveys. It will be of interest to some of you to know that within two years there will be a complete topographic survey of this valley for the determination of watersheds, the work now being well advanced. It is hoped that by that time every creek in the valley will be traversed and every reservoir possibility investigated, stream gauging all the while being carried on.

Just another instance of the importance of anticipation. In the recent report of the Agricultural Commission reference is made to well drilling, and in all probability it will be considered when Parliament again meets. If the problem is to be intelligently dealt with, then the Honourable the Minister should have a report of what has already been accomplished in the province. By December it will be complete and will comprise an analysis of the attempt of fifteen years ago in the Railway Belt and complete information of some 200 wells in the Fraser river delta. Also general information of how this work is handled in other countries with figures of costs in detail. Well drilling means large expenditure of money and for that reason, if any policy is formulated it must be upon lines that will ensure the greatest success possible.

The success of any administration depends upon the principles laid down. In the case of water rights, a knowledge of business, engineering, and some branches of law is involved. Because of this, the principles enunciated by a recent writer particularly apply. These are:

Decision.
Initiative.
Preliminary planning.
Subordination of detail,
Discipline, and
Concentration to secure success.

Notwithstanding what may be your opinion of how far we have applied the first five of these, we have lived up to the last one in respect to the old records. As already stated this special field work will be practically completed this year. The success that has attended the Board of Investigation in its adjudication is encouraging. Out of 3,000 decisions to date, but three appeals have been made, and two of these are now in default. We are hopeful this measure of success will continue, and as respects administration a beginning has been made.
(Applause.)

CHAIRMAN: The paper is open for discussion.

Within the last few minutes, the following telegram has been received:

OTTAWA, Ont., August 17, 1914.

Chairman, Irrigation Convention,
Penticton, B.C.

On behalf of myself and Government desire to express cordial wishes for a successful convention. Deeply regret that the grave condition of public affairs made my personal attendance at comvention inpossible.

MARTIN BURRELL.

CHAIRMAN: The last address on the programme this afternoon will be given by Mr. L. O. Armstrong, Lecturer on Colonization. Mr. Armstrong has given over 350 lectures on colonization, in the United States, during the last year.

Mr. ARMSTRONG: Mr. Chairman, ladies and gentlemen,—I feel that I have to speak before an audience this afternoon that knows very much more about the subject than I do, but I had a great deal to do with water a good many years ago. First in the Columbia valley, I had a young brother there, one of the pioneers of the Windermere country. His potato field looked very thirsty, and so I said to them one day, "Why don't you divert that creek coming down there?" and they did with rather disastrous results. Fortunately he arrived before they were drowned out.

I feel very much in the position of the locomotive engineer who was called on by the Bishop of London. The Bishop was undertaking a very important mission in the slums of London, and he determined that the only way to make it successful was to interest the people of the slums and make them contribute towards the expense. He went to a dock labourer and said, "What will you give a month? You ought to give something." "Well," said the labourer, "you are doing a good work. I will give you two and six and give up tea and sugar."

The bishop was very pleased indeed, and turned to the dock labourer's son, a locomotive engineer, and said, "John, what will you give?" John did not think there was much fun in it, but he pondered a moment and then said, "Well, I will give you tuppence, and I will give up the salt mackerel. I don't have it often and I don't like it."

I feel somewhat in that position, but I have been spending three interesting months during the last three months, all more or less in connection with the use of water. The first month I spent in Quebec and, on two or three occasions, I diseussed irrigation but they laughed and said they didn't want that there. At one point it had rained a little in May and had afterwards been very dry and they had no crops to speak of. A meeting was called and I contributed this,—I said, "You have five hundred motor-boats on this lake. Supposing you started

some of them to pumping." Most of them laughed at the idea, but two or three tried it, with such wonderful results that I expect to see in Quebec irrigation by pumping when necessary. I expect you know that province, with its big valleys, the Appalachians on the south and the Laurentians on the north. They can irrigate enormous areas and after this year's experience, I am sure they will.

Then I came up to Ontario, the old part of Ontario. There was no use talking irrigation there. They had been having some trouble with army worms and in the north part of Ontario, up the Ottawa valley, they had had some drought and there was a terrible scarcity of hay.

After that, I came to Manitoba and Alberta, and I have been travelling about a hundred miles a day all through Alberta, in motor cars, and one impression I brought away with me is that every district in Canada that is short of hay should go to middle and northern Alberta and gather the hay that is growing there. It is going to waste there this year. I see they are proposing to raise food for the Empire by sending idle people on the land, and it is our duty, who are not fighting, to help along the feeding of the Empire; and that is one very practical way, I think, to save the hay.

Among the interesting experiences during the summer, I was reminded of one by Mr. Smith's talk, and it showed me the folly of exaggerating. I was driving from Toronto to Montreal when I saw a very nice young fellow on the train. He was very anxious to be on time. I said, "What's the matter?" He said, "My old father and mother have the grippe terrible bad and I have got to get to them on time or I am afraid I won't find them alive." I said, "Don't you know a specific for the grippe?" He said "No." I said, "Canadian Club whisky and rock candy." And I got him off, along with a bottle of whisky. I saw him two weeks afterwards and hesitated a little, but finally I said, "How are the old people doing?" He said, "They have been tight ever since." (Laughter.) That gives you a very good lesson in moderation.

I am going back to the United States, and here I want to say that the American contribution to our colonization has been a splendid one. I have seen the results. During a trip to some of the back settlements, the American farmer would say, "What's the news of the war?" I told them that Canada was giving a million bags of flour; and some of them wanted to go and fight, too. They said they did not want autocracy anywhere in America, and they have offered not only flour but men. (Applause.)

I have had a most interesting time in making moving pictures of irrigated and non-irrigated bits of land, and the result is convincing. I know the troubles and the arguments against irrigation. but I have seen enough results to make me feel sure that the development of the dry parts of Canada is a dead sure thing and that farming anywhere in the driest parts is the surest kind of farming where there is water, and it is intelligently used.

I have lectured from Maine to Santiago, and have told them just what I wanted to and I have never had an insult or a narrow-minded objection. I have had a few real estate men object, but even there I have had a full audience, and an audience that would not listen to objections; that speaks splendidly. But remember, we have done the same thing. We have had American agents come and lecture to the people in Quebec and Ontario, and they have filled up

Michigan and other states and there was never an objection. We had no West then. There was no way of getting into the Canadian North-West, and in that connection I am reminded of W. W. Ogilvie. He said that his father was a baker, but that he got a little better education and thought it would be fine to be a clerk in Bruce Mines. So he went up there and had a very hard time. The schooner was wrecked and they had to go all that winter on scrapings of flour which they mixed with bark. So he made up his mind when the spring came, that the flour business was good enough for him and he gave up mining and came back to Montreal. He died, as you know, a multi-millionaire, and the biggest individual flourmaker in the world.

Now I want to say that I am thoroughly loyal, and that I believe members of my family have fought in every war in the British Empire, but we cannot expect all our immigrants to be that loyal, because they were not brought up that way. If they turn out to be good citizens and do things quickly and well, what more can we expect. (Hear, hear.)

I remember how my friends in Ontario and Quebec laughed at me and said, many years ago, that it was ridiculous to ask anybody to come out West, and I said, what about the valleys of British Columbia and the coast? They said it was no good, there was no land there. Well; I persisted, and you can imagine the interest with which I travelled across those prairies and down these great valleys, and have noted the wonderful transformation that has taken place. It makes my life one of intense interest, and in noting the constant development and comparing it with that of the United States, it makes me feel more active and gives me more enjoyment in the prosecution of my work than ever before.

Now, I dont' want to be vain-glorious and teach conceit. When one comes to my age and looks back, it is difficult to imagine how personal conceit can find any place. If everybody only knew us as we are how little room there would be left for conceit, but there is also something to be ashamed of and if we do not all do our best to make this country what it ought to be, then we may have that feeling of shame. Let everyone of us contribute towards making this portion of the Empire what it ought to be. (Applause.)

CHAIRMAN: I will announce again the meeting of the Committee on Resolutions immediately on the adjournment.

I want to call your attention to the programme this evening. It will be just as printed on the programme. There are only two speakers, and both gentlemen are here, and I can assure you there is going to be the treat of the convention this evening, and we want a good attendance. It will begin promptly at eight o'clock and the meeting is now adjourned until that time.

MONDAY EVENING SESSION.

CHAIRMAN: Ladies and gentlemen.—Before beginning our programme, will any of the delegates who hold standard certificates kindly come up and turn them over. We need about ten more to make up the necessary number.

It will hardly be necessary for me to introduce the first speaker of the evening to a Canadian audience, particularly to an audience in Western Canada. Doctor Rutherford, who is Superintendent of Agriculture and Animal Industry for the Canadian Pacific Railway, is to give us an address entitled:

INTER-DEPENDENCE OF FARM AND CITY.

Dr. RUTHERFORD: Mr. Chairman, ladies and gentlemen,—I have never attended or had the pleasure and privilege of addressing an audience in the Okanagan valley before, although I have spoken to a good many Canadian audiences and a great many audiences in Western Canada. On this occasion, when I see such a very large and intelligent audience, and particularly so many members of the fair sex present, I feel somewhat embarrassed. In fact, I feel somewhat mortified, and I may explain the use of that word, which is not very frequently heard nowadays. After the very eloquent addresses we have had to-day, I feel rather like the old servant who had been on a holiday and had made, on the way back, a sea voyage from Stranraer to Glasgow, a hundred miles, of which about sixty was in the open Firth. After she got home, she was asked how she enjoyed her trip. "Oh," she said, "it was grand altogether—a grand trip, except that sea voyage. There was an awful storm. The captain said he had never seen such a storm before. We were all verra sick and I was most terrible mortified. I was never so mortified in my life."

"Well, that is too bad, but why were you mortified?"

"Eh, I was in the ladies' cabin and I was terrible mortified."

"Yes, but why?"

"Well, you see, ma'am, there were a lot of gran' ladies, and I was terrible mortified."

"And can't you say why you were mortified?"

"Well, ma'am, there was a lot o gran' ladies and they had been eating all kinds of gran' things, pies and cakes and puddings, and we were all verra seasick, and I hadna a thing to show but plain parritch." (Laughter.)

Well, I feel very much the same. After the eloquent addresses of our friend, Mr. Smith, and a number of others, to mention which would perhaps be to invite invidious comparison, I feel that I have nothing to offer but "plain parritch."

There is, however, no subject in the world which appeals to me more strongly than the one which forms the title of the few remarks I propose to make this evening, namely, "The Inter-dependence of Farm and City," the inter-dependence of the rural community and the urban community.

We have recently heard much of the Great Illusion, and Norman Angell has certainly set forth most clearly the great illusion of war. There is no question at all that war to-day is obsolete, but this war in which we are now engaged is a righteous war—the most righteous war I have any recollection of—and we trust to come out right in the long run. (Applause.) To my mind, however, there is an even greater illusion and that is in regard to life and what life is and to what life owes its being and what the duties of life are. We find now both in the old world and in this great new world of ours, an overwhelming tendency on the part of people, particularly young people—although it is not confined to

them, there are a great many people old enough to know better following the lead of the young people—to crowd into the cities and away from the land. Our public men are also victims of this illusion. We find that our press, our daily press, is, to an enormous extent, subject to the great illusion; the illusion that the world can go on, can live or move or have its being independent of the land, of the farm and of the farmer.

When one considers that if it were not for agriculture, for the farmer, and the farms, we would have no great institutions; no great railways; no banks; none of our great financial organizations; none of our great industrial establishments; none of our great commercial enterprises: that they are all absolutely dependent on the farm and on the farmer, and how people are forgetting that great fact—when one considers the inevitable result if the present conditions continue, then the unreality, the fictitious nature of the life we have been living, will become apparent. I speak somewhat feelingly, because I happen to be living in a city which is a marvel in its way, the City of Calgary. I was in Calgary seven years ago last spring, when I don't think there was a foot of pavement in the whole city. There were no paved streets and they had just started a couple of motor busses to accommodate the people in the outskirts. To-day, it is a city of not less than 80,000 people; a most modern city, with nearly one hundred miles of paved streets, nearly one hundred street cars in full commission; great big sky scraper buildings on corner after corner, and I often ask my fellow citizens in Calagry what it is all about, where it came from and how it is going to stay, in view of the fact that they have so far done practically nothing to assist in the development of the agricultural interests in the adjacent country. All through the Northwest we find the same thing. These big urban communities are springing up; they are being built on adventitious capital; on borrowed money, and the people apparently do not realize that unless the country surrounding them is developed from an agricultural standpoint, their existence cannot continue.

There has been far too much tendency on the part of the press, and on the part of many people who ought to know better, to belittle the farming profession. As a matter of fact, the business of farming is the business of the world. We in Canada are very fond, in our immigration literature and elsewhere, of boasting about our agricultural pre-eminence, and yet we are great importers. As you have just heard, British Columbia alone has imported in the course of a year, twenty million dollars' worth of foodstuffs. When I used to live in Manitoba, I was often surprised at some of the farmers living there—but these were not the real farmers, they were grain miners, land robbers, gamblers, dead game sports—willing to stake everything on the turn of the weather, or the turn of crop and, unfortunately, occasionally—I say unfortunately advisedly— they succeeded. I used to see these so-called farmers without any milk in their tea, unless they got it out of a can; buying potatoes from the grocers; loaves of bread from the baker, and there were butchers' wagons going all round the country peddling meat to these practical agriculturalists. I have even seen farmers hauling out a few bales of hay from town to feed their horses through seeding. We may laugh at farmers such as these but how much wiser are we as a nation. The individual farmer has an advantage over the rest of us, because

he can raise almost everything that constitutes a living in this country, whereas the man in the city has to find the money to pay for these things, but before we laugh too heartily at the individual farmer who buys condensed milk, baker's bread, vegetables, butter, meat and hay, we had better take one good look at ourselves as a nation and as a country.

We are importing to-day from Australia and New Zealand, enormous quantities of mutton. For a long time it came in on the Pacific coast only, but for nearly three years now, that mutton has been coming in by the eastern coast as well — from St. John in winter and Montreal in summer — and travelling westward until the mutton from the Atlantic and the mutton from the Pacific have met midway on the prairies. We have in Canada millions of acres of good sheep pasture. Mr. Armstrong pointed out what a pity it was, or rather what a sin it was, that the good grass in the northern parts of the Province of Alberta should grow up and wither when it might be made use of as provender for the horses, so that we could ship the hay grown in the eastern provinces to the seat of war. We have millions of acres of good sheep land, the grass on which goes to waste annually. We have in this great agricultural country of ours, two million sheep — two million sheep! The Republic to the south has fifty-two million; the good little old British Islands have thirty-four million; Argentina has thirty-eight to forty million and Australia one hundred and ten. At the present time, we in Canada, have two million sheep and we are buying from Australia, both in the East and the West, and also bringing in large quantities of live sheep and dressed mutton from the Pacific Coast states to the south. Last year and the year before sheep were coming into Toronto, going from Wyoming to Chicago and thence to Toronto, to Cobalt and Ottawa, down to North Sydney and Cape Breton and being shipped from there to Newfoundland. Not only that, but we can go out right here, I may be wrong; you may not be as far advanced as other communities; but I venture to say we can go out here in this town, and go into one of your shops and find a large yellow tin, labeled "Fray Bentos," containing corned beef, and very good corned beef too. This beef is put up either in Argentina or in Uruguay and shipped from the River Plata across to England and back to Montreal, or it comes from England round the Horn to Vancouver. It is shipped by rail into the prairie country from Montreal, and is sold to us in the great beef producing country of Alberta; this beef has made the voyage from South America to Europe and back again and three parts across this continent. Evidently when we consider our position as a nation we have not very much to say about the farmer who buys condensed milk and baled hay.

Now, I am not telling you this to amuse you; I think it highly discreditable that in the face of such conditions a great country like this should, for the last ten years, have been busy building up urban communities at the behest of the real estate man and borrowing money all over the world. Mutton from Australia, butter from New Zealand, beef from South America, eggs from China; isn't it fine. What a reputation to enjoy! We build up our cities and draw our young people by the attractions of the electric lights and the "movies" away from the farm; and they walk mincing along the street, and if they see a fellow with a homespun shirt and overalls, they turn up their noses and say he is a

hayseed. (Laughter.) We are going very fast in this country, but we are going a little too fast. One must take time to think. We must get down to brass tacks (applause) and realize where we are at.

Now, you may say, what has all this got to do with the inter-dependence of the farm and the city. Well, the sooner the business men of the cities wake up to their responsibilities in this connection, the better for all concerned. There is not a town or community in Canada which should not be putting its best brains into the solution of this great problem. There is not a city council or board of trade in the whole Dominion that ought not to be giving the most careful consideration to this matter. We are waking up though but very slowly in the prairie country. We have several communities going now. North Battleford, for instance, has established the North Battleford Live Stock Company. The city of Lethbridge is doing some aggressive work, and the city of Canora, in northeastern Saskatchewan, is following on the same lines. The city of Calgary is also becoming alive to its duty in this connection. When we consider that farmers last year, were getting seven to seven and a half cents a pound for live hogs in the Calgary market, while the price of hogs in Toronto and Montreal was from $10.40 to $11 a hundred, and that at the same time the wholesale price of bacon and hams in Montreal was from twenty to twenty-two cents, and the wholesale price of bacon and hams in Calgary from twenty-three to twenty-six, the need for intelligent action, there or elsewhere, must be admitted.

It was mentioned to-day that it is not uncommon for farmers to get into financial difficulties through misapprehension — I want to put that as mildly as I can — through misapprehension of the possibilities of the district in which they decide to settle and invest their little all. If some reports were true, it might be said that it was through misrepresentation, but I want to be fair and mild, so we will say it is through misapprehension. They get into one line of farming, one line of production. On the plains it has been growing wheat, while here it is fruit, and they find themselves in difficulties through not getting the returns from the one line of farming they have been induced to believe that they would; and right there is where the city can do a very great deal to help the farmer out. To give an illustration of the difficulties into which people get by sticking too closely to one line of farming, I may just cite a statement made by Professor Worst, of the North Dakota Agricultural College a year ago last January before the Tri-state grain growers' congress held in Grand Forks. The United States Government, after a very careful research extending over many years, has ascertained that the average cost of growing a bushel of wheat is 58 cents. In Saskatchewan, I think, a special commission placed the sum at 55 cents. I suppose on account of the land being newer and the yield correspondingly greater. Anyhow, there is not much difference. Now, Professor Worst figures that a 20 bushel to the acre crop means the extraction of 46½ cents per bushel from the soil in fertilizer. Add that to the 58 cents and you get $1.04½ which that bushel of wheat has cost the farmer, because 46½ cents is capital invested in that bushel of wheat. Now, if that is sold for 60 or 70 cents a bushel, you can easily see that it is going to take the country a long time to get rich at that rate. Fruit trees, possibly, don't exhaust the soil so rapidly, but I entirely

agree with Mr. Smith that any farmer in any country has got to go in for diversified farming, and so conserve so far as may be possible, the fertility of his soil. He must provide from his land, as far as its potentialities will warrant, everything he requires for himself and his family, and when he has done that, he is a long way ahead of the game, and is in a position to go forward and by the intelligent disposal of his surplus products, do much good both for himself and the country in which he lives.

Now, to get back to North Battleford and Lethbridge and Canora; these cities have realized the true state of affairs, and have made arrangements with one of the leading Canadian banks whereby they can and do supply selected farmers with live stock on easy terms of payment, and the scheme is working very well and doing a very great deal of good. Every community in the country ought seriously to consider the inauguration of co-operative action between the city and the country, the farmer and the town, because it is wonderful what can be done in that way. I am not here to advertise the Canadian Pacific Railway Company, which is my employer, but I want to tell you briefly what we are doing. Within a little over two years we have bought for cash over six thousand head of cows and heifers, and a large number of hogs, and have supplied these to settlers on the Company's land on long and easy terms of credit. We are doing what we can and the work is going bravely on. It takes a great deal of money and effort, as well as close observation and careful watching. We cannot be as careful in our selections as these organizations to which I have alluded, but the results are very encouraging and the amount of money in the shape of interest and payments on principal which from time to time keeps coming into my office is surprising. I know that many farmers who two years ago were in very unpleasant and distressed circumstances, are now finding their feet and getting along exceedingly well. Their children are better dressed and the mothers are better dressed and much happier looking and, in some cases, even the fathers are less grouchy than before the campaign was inaugurated. (Laughter.)

It is not only financial assistance that can be given by the city to the country. The city of Lethbridge is a very enterprising place. If the finances of the city of Lethbridge were commensurate with the enterprise of its citizens, it would be one of the most wonderful cities on earth — I don't know but what it is anyhow. They have organized what they call the "Country Cousins" section of the Board of Trade, and every farmer in the district is made to feel that he is welcome to the meetings, and if the members of the board can give any advice or assist the farmer in any way, they are only too glad to do it. They are breaking down the fence between the farmer and the city man, and that is the proper thing to do. We want to give the farmer in every case where it is possible and where he is willing to accept it, the benefit of the experience, the financial, the business knowledge, which the city man possesses; at least, which many possess. There are some exceptions which prove the rule, but in every community there are men who have the knowledge of business which the farmer, from his environment and training, is not as a rule expected to have, and all these things can be worked out.

Take co-operation: those who are familiar with the Canadian farmer know that he is not a very good co-operator. He is a poor hand at co-operation. It

is true we have in eastern Canada some very fair co-operative organizations; the creameries and cheese factories have been as a general rule successful. The co-operative packing houses, however, were a failure. The farmer could not stand the temptation of the combine when it offered a cent or a cent and a half more than his own packing-house could offer, and in that way the big combines soon cut them out of the way. It is astonishing what can be done in the way of co-operation. A great many business men are afraid of that word. They say, "We don't want it, we want the farmer's trade in the ordinary way," but they should realize that if co-operation will make the farmer prosperous, the very best thing they can do is to help the farmer to co-operate, because their own prosperity depends on his. Co-operation is spreading all over the world. Co-operative credit in Germany and in many other countries has made tremendous advances. The German peasantry save very large sums of money and develop their resources in a most remarkable way; the same is true of Italy and of France; but perhaps the Scandinavians and particularly the Danish, are the best co-operators of all. Even Ireland, rather strangely, is making a great success of co-operation in several important districts under the policy introduced by Sir Horace Plunkett and so ably carried on by the Board of Agriculture and Technical Education at Dublin. In Denmark, co-operation in a great many lines of agricultural work has almost reached a state of perfection. Denmark is far in advance of other countries in the breeding and distribution of stock, in feeding and marketing, and the Danes do a tremendous business in bacon, hams and butter, all on co-operative lines. When one bears in mind that Denmark is a small country with a rather unfavourable climate, it is interesting to note that it has the largest agricultural trade in proportion to its size and population of any country in the world. The total exports are about one hundred million dollars a year, of which approximately ninety millions consist of agricultural products, and in these lines the Danes are our closest and keenest competitors in the London market. It is almost impossible for any other country to seriously compete in class and quality with Danish bacon and it is the same with butter and eggs and many other similar products.

To show what can be done: co-operation is of comparatively recent growth there; in 1888 they had one pork factory which handled twenty-three thousand hogs; and twenty years later in 1908 they had thirty-four factories handling over a million and a half of hogs bred on the best lines and in the most intelligent way; fed in the most intelligent, economical and effective manner; and marketed under the most favourable conditions; and when they are put on the market, the farmer gets the profits. I know a Dane now in Alberta, a very good man, getting rich where other people are getting poor. You know one finds all through the Canadian West, and I am willing to risk the statement that the same conditions prevail here, that two men may be sitting down on adjoining parcels of land, under exactly the same conditions, financial and otherwise, equal in every respect, and yet one man steadily gets rich and the other man as steadily gets poor. Have you not got that condition here? Yes. I thought so. You have never been anywhere where they did not have it, and this Dane in Alberta is one of those who are getting rich. He has grasped the great point, that the first thing to do is to establish a home. Like the old Scriptural text, if a man

establishes a home, he is not very long getting the other things about him — "Seek ye first the Kingdom of God and all other things shall be added unto you." I will just give one illustration, and the ladies will pardon my plain speech, but there was a sow and this man owned it, and she was a very good sow in some respects but not in all, for she killed her pigs, a most reprehensible thing to do, and the man decided that she would not be profitable to keep under the circumstances, and so he fattened her and eventually was offered a price of $15 for her. But he sold her for nearly $75. He killed that sow himself, dressed it himself and made use of every little bit that it was possible to use, and he cured the bacon and cured the hams, and he sold them to a railway contractor for his men to eat, and cleaned up exactly $73.75 for the sow for which he had been offered $15. There is only one little illustration of what can be done by the use of intelligent methods in farming.

If we want to improve existing conditions, we must get our city men to take a real live interest in the farm and in the farmers; to help them along and assist with advice; to make financial arrangements for them when they are in a tight place, provided they are the kind of men to appreciate it and redeem themselves later; and then we will be doing a very great work. We will be doing something to relieve us as a nation from the disgrace of neglecting the one great source of wealth, the great source of livelihood, the greatest thing in the world — agriculture. You know what the King of Brobdingnag said to Gulliver: "Whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than the whole race of politicians put together." (Applause.)

I know this has been rather a dry discourse, but I warned you carefully that I had only the plainest of "parritch" to offer and I have done my best in the time available to demonstrate the importance of this great question. I think we all ought to get together the men and women living in our towns and cities, and the men and women living on our farms, that we had better look a little more closely into where the money comes from, where the sources of national, individual and community wealth are, and what they are; in every case, you will get back to the soil wherever the trails may appear to lead. We have in Canada, particularly in Western Canada, far too many of these newly rich people, the lately risens. They are very wealthy in their minds, many of them, and have fine motor cars, and put on lots of style in the matter of dress. In fact the foolish extravagance of life to-day is very painful and very ridiculous at the same time. Our people should do much more thinking than they have been doing in the last few years. Any amount of adventitious capital has been rolling into the country; money has been got in every possible way it could be got and on all sorts of security. It is true we have shared in the financial depression which was world wide and no doubt the war was casting its shadow before, but apart entirely from that, ladies and gentlemen, we have been most extravagant and prodigal in our expenditure. We have simply been blowing money in, spending it right and left like, as the old adage says, drunken sailors. But, there is always a day of reckoning. In London and in all the other great financial markets of the world, the fact that we have been over-exploiting our

natural resources is well known and thoroughly understood. The greatest curse this country ever had was the horde of human locusts calling themselves real estate men, a most unhappy and inappropriate designation, who swarmed all over the country and put false and mistaken values on the land and everything else in sight or in many cases invisible. (Applause.) If I have done no more to-night than make half a dozen people put on their thinking caps, I will feel satisfied that my little effort has not been in vain. Ladies and gentlemen, I thank you very much for your kind attention. I know the subject has been a dry one and I apologize for it in that sense, but I do not apologize a bit for telling you the plain truth. (Applause.)

CHAIRMAN: For the benefit of fruit growers who are anxious to hear Mr. Whistler, who is to talk on fruit growing, and the care of apples, I may say that he arrived to-night and will address the convention on Wednesday afternoon at two o'clock, and an hour and a half has been set aside for his address and the subsequent discussion. Deferring to the wishes of the delegates, the executive have arranged with Mr. Smith to again address the meeting at 11.45 to-morrow morning. (Applause.) We are now going to be favoured with

AN ILLUSTRATED TALK ON THE ORCHARDS IRRIGATION METHODS OF CALIFORNIA

by Mr. Frank Adams, in charge of Irrigation Investigations, University of California.

Professor ADAMS:

Mr. President, ladies and gentlemen,—The paper your officers have been kind enough to invite me to present will be confined to describing and illustrating California orchard irrigation methods from the practical standpoint of the irrigator. I shall endeavour to do this by reference to several important and typical sections. Possibly much that is in my paper will not be new to many of you. Possibly you will find that California orchard irrigation methods are not far different from, or far in advance of, those you are using. However, if the latter suggestion expresses the fact, it may be worth your while to find out from the description given by my paper and the accompanying pictures that an older irrigated section much more experienced in orchard growing than you have yet had opportunity to become has not far out-distanced you in the art of applying water to fields.

PRACTICE IN THE SIERRA FOOTHILLS.

The Sierra foot-hills of California extend over a north and south distance of 400 miles and from the higher east-side plains of Sacramento and San Joaquin valleys to elevations of 2,500 or 3,000 feet. Topographically the cultivable areas vary from gently sloping, as near Porterville, near the southern end of San Joaquin valley, to steep and rolling as about Auburn and Newcastle, on the main line of the Central Pacific, north of Sacramento. At Porterville the mean annual rainfall approximates 10 inches; at Nevado City, 50 miles northeast of Sacramento,

Some of the delegates at Eighth Annual Convention, Penticton, B.C., August, 1914.

with an elevation of 2,500 feet, it is about 55 inches. Along the lower foot-hills and higher valley plains, citrus fruits predominate, with increasing areas of olives, while deciduous fruits, chiefly peaches, plums, grapes, and pears are grown in the sections of slightly higher elevation. Above these, apples are coming to be planted in increasing numbers.

Excepting in the sections of lower elevation where much water is pumped from wells and raised 50 or 60 to 150 or 200 and, in rare instances 400 feet, water for irrigating the foot-hill orchards is generally carried in ditches and pipelines that were constructed in connection with mining development 40 or 50 years ago, and in recent years rehabilitated for irrigation and power. From these it is taken to the highest points of the orchards in ditches and flumes and pipes, much as in the orchard districts of British Columbia, in the main deciduous centre about Auburn, Newcaste and Penryn in Glacer county, delivery is made to the orchards in small streams flowing continuously from May to October, and such other portions of the year as irrigators may call for it. One miner's inch, equivalent there to $11\frac{1}{4}$ gallons per minute, or one-fortieth cubic foot per second, serves from 5 to 8 or 9 acres, and costs irrigators $45 per year, or from $5 to $9 per acre. An average expenditure for distributing pipelines and flumes on the farms is about $10 per acre.

On all of the orchards of this foot-hill section, applying water in furrows is the only feasible procedure.

Head laterals are almost invariably only furrows ploughed or slight grades around the upper edges of the fields or down ridges, in the latter case erosion sometimes being checked by frequent slight drops protected by sacks or other durable material.

When water is carried down such excessive slopes that furrow head ditches, even when thus protected, are not feasible, ordinary V troughs made of 1-inch by 6-inch redwood are substituted, and water is taken out to the furrows through $\frac{1}{2}$-inch or $\frac{3}{4}$-inch holes bored in the bottom of the troughs.

The furrows leading from the head laterals are run in numerous different ways according to soil, topography, and personal preference of the irrigator.

Sometimes they are carried directly down the main slope, one on each side of the tree row. If the slope is considerable and the soil takes water slowly, off-sets are made in the furrows just above the trees in one furrow and just below them in another, or the single furrows used may be carried in semi-circles around the trees. Another variation is to scoop out a pocket one foot or so in diameter just above each tree this being kept full of water from the furrows during irrigation. Still another way when running the furrows with the slope is to zigzag them on gentle curves, although this plan is usually only followed where the slopes are relatively low and even.

As a rule in the main deciduous fruit sections of the Sierra foot-hills not more than one or two furrows are used when the water is distributed down the main slopes, and it is not over gratifying to say that in these sections the furrows plowed out in the spring are generally allowed to remain undisturbed throughout the season and until plowing and cultivating time in the following winter and spring. It is my belief that in most cases the use of only one or two furrows for each tree row is not good practice where the furrows are carried directly down

steep slopes. Experiments made in southern California under the auspices of the Irrigation investigations have shown that lateral percolation is much less rapid than downward percolation unless the downward percolation is arrested by an impervious subsoil. The same fact was recently observed in the Fair Oaks section of the Sierra foot-hills where, after running in furrows for nearly a week, water had not percolated far enough from the two furrows to enable a sharp steel rod to be forced more than 3 or 4 inches into the soil 3 feet on each side of the furrows, whereas the rod was very easily extended into the ground a full 3 feet directly under the furrows. Where furrows are run across the steeper slopes in the foot-hill belt about Auburn, Newcastle and Penryn, they are now running less this way than formerly, three or four furrows are quite usual, but if the land is locally very uneven these must be made quite steep and then be carefully protected from gopher and mole holes or other conditions that lead to breaks and resulting erosion which may be very hurtful.

Where a considerable stream—say 6 or 7 miner's inches—is being carried down a ridge, a single deep furrow zig-zagged on a low grade back and forth between three or four tree rows is found to be effective, not only in well irrigating the ridge, but also in carrying water to smaller furrows leading on both sides from the larger zig-zagged furrow.

How long to make furrows, how much water to run in each, and how long it should be allowed to flow are all of course equally important with the number of furrows run in accomplishing satisfactory wetting.

In the Sierra foot-hill belt, the length of furrows generally does not exceed 300 or 400 feet, because, excepting down near the plains, even slopes are seldom continuous for greater distances than these. The rule followed by the best irrigators is to make furrows no longer than the desired stream will flow through in a few hours. Sometimes as much as twelve hours is required to get a very small stream from the upper to the lower end of the furrows, but so much time is obviously excessive and is bound to result in deeper irrigation at the upper side of the field than at the lower side.

The size of the stream varies with different irrigators and on different slopes and soils from one-tenth miner's inch—a little over one gallon per minute—to several inches. The division of 10 miner's inches among 75 to 90 or 100 furrows 200 to 300 feet long, with water running twenty-four hours in each furrow, which was recently noted on a profitable foot-hill orchard near Auburn, is typical of practice in this section. In this case the full daytime was required by the irrigator to get the water through the furrows and it was then left running in them throughout the night. Some orchardists in this section want the water to continue in the furrows for 48 hours and some shut it off at the end of 12 hours.

Ordinarily, with the streams of water used, about two weeks are required to irrigate an entire holding, after which the next irrigation is begun at once. When fruit is ripening the usual practice in the Placer County belt is to irrigate one every seven to ten days, with some growers irrigating even up to time of ripening.

PRACTICE IN THE CENTRAL AND COSTAL VALLEYS.

Orchard irrigation about Yuba City, in Sacramento valley, and in Santa Clara valley, 50 miles south of San Francisco, is thoroughly typical of that

throughout the main central and smaller coastal valleys of California. Deciduous fruits and nuts are the orchard fruits grown and irrigated there. In neither section is orchard irrigation practised, yet out of the transition from the crude beginning methods to the more refined methods that water scarcity in time invariably compels. In both sections irrigation water is wholly or most largely obtained from wells, with pumping lifts ranging from 6 or 8 to about 150 feet. With a very few exceptions some form of flooding system is followed in applying the water, the few exceptions in which furrow irrigation is practised mainly being of recent origin.

In flooding orchards, two plans are chiefly adhered to—basin flooding, in which levees are made around each tree or around groups of two or three trees, and what virtually amounts to border flooding, in which levees are made in the direction of the greatest slope down the centres of each row or of every alternate row.

In comparison with the so-called border flooding orchards, the basin method is relatively a refined method, for it permits of quite even water distribution.

Where a basin is formed about each tree temporary levees are thrown up, checker-board fashion, in each direction, midway between the tree rows. Sometimes these levees are merely back-furrows made with an ordinary mold-board plough. More generally, however, they are made with an iron or wooden ridger or with a disc cultivator set to throw toward the centre.

Before making the levees for basin irrigation it is usual to disc once down the centre of each row and similarly cross-wise in order to loosen the surface soil sufficiently to give ample loose soil for the levees. The breaks in the levees caused by the cross-ridging are filled by means of a one-horse jump scraper before irrigation is begun, or with shovels as a part of the labour of irrigating. The usual practice is to begin filling the basins with water at the lower ends of the rows first, always closing them after filling, in order to prevent an excessive quantity of water entering any basin, which would result in uneven distributing. Sometimes the water is run to the lower basins through the entire tier of basins lying between the lower basins and the head-ditch directly above the first basin. This plan is objectionable, however, because in following it, water runs much longer in the upper basins than in those at the lower ends of the rows. A much better practice is to make double levees in the direction of the main slope in the centre of every other row, these double levees forming a shallow surface ditch through which water can be carried to the basins on both sides. Another good plan is to carry the water to the lower basins in galvanized iron surface pipe, 8-inch sizes, costing in California about 25 cents per running foot.

The cost of ridging and checking for basin irrigation in California orchards approximate 75 cents per acre at each irrigation, provided all of the work is hired. One man with four horses will disc and ridge 10 acres in one day, and one-half day with one man and one horse are usually necessary for filling in the breaks at the cross-levees. The number of irrigations given per season in the valleys mentioned range from one to three.

Where the border plan of orchard flooding is followed it is not uncommon to run water between levees 20 to 60 feet apart as great distances as 700 or 800 feet, obviously resulting in very much more water soaking into the soil at the

upper ends of the rows than at the lower ends. Where the water is run only 200 or 300 feet this method is considered less objectionable, but at the best it is a crude plan which intelligent irrigators do not long follow.

When flooding orchards in the sections mentioned, it is quite usual to apply from 5 or 6 to as much as 12 inches in depth at one irrigation. Neither green fruit shippers nor canners seem to object to irrigating such fruits as peaches right up to the time of picking, the last waterings greatly swelling the fruit. Desirable practice in this regard has not yet been conclusively worked out, although a number of investigators in different states are considering the matter. Where Santa Clara orchardists have no pumping plants and buy water from neighbouring plants, the average price paid is around $12 per acre-foot.

Occasionally it happens that an orchardist will merely flood promiscuously, running furrows here and there as most needed to accomplish the flooding. It seems needless to say that such practice must result in very uneven distribution and much waste of water, which, at the price paid for water in such valleys as the Santa Clara, is almost the same as money. Rather hasty flooding is sometimes the only feasible way in Santa Clara valley, however, for the winter and spring freshets carried by the numerous creeks entering the valley are run hurriedly onto the land whenever available, and irrigation during rains or during blossoming season is common practice, the extent of it depending directly on the amounts of creek water available. This winter storing of water in the orchard soils of Santa Clara valley is undoubtedly good practice when not carried to such an extent that the soil is leached. In some cases, however, it is apparently carried too far.

As compared with proper furrow irrigation, neither basin nor border flooding of orchards can be considered good practice, except where land is so flat and so sandy that furrow irrigation will result in very uneven distribution. The prime objection to any form of orchard flooding is the alternate puddling and baking of the soil that results, thus inevitably leading to so breaking down the granular condition of the soil as to make effective mulching difficult if not nearly impossible, at the same time preventing that free and full soil aeration that is essential to soil fertility. Another serious objection where irrigation water is costly is the heavy evaporation loss that takes place from the irrigated soil before it is dry enough to cultivate. Even after it is possible to cultivate orchards that have been flooded, a prominent Yuba City peach grower who has made a beginning in furrow irrigation finds that, under proper practice, five cultivations are necessary after each flooding, whereas two will accomplish as much good if water has been applied in deep furrows and the surface soil not wetted.

Fortunately both in the central valleys and in Santa Clara valley a beginning has been made in furrow irrigation, most frequently, possibly, in the case of young orchards. One 120-acre English walnut orchard in the latter valley visited has been equipped with a modern underground concrete pipe and stand system of furrow irrigation. Of course, only high priced products will justify the cost of the pipe and stand systems of water distribution, yet these are not essential in furrow irrigation. Orchards having a selling value of $700 to $1,000 per acre, however, which are not uncommon either in the peach section about Yuba City or in the prune section of Santa Clara valley, should be able to bear

the slight additional capital investment of say, $20 per acre to provide a modern distributing system.

Very frequently furrow irrigation is difficult because of insufficient grading before planting. This unfortunate condition is hard to remedy, but is now being prevented by orchardists of foresight when setting out growing trees.

PRACTICE IN SOUTHERN CALIFORNIA.

The most careful methods of irrigation in America have undoubtedly been developed in the orange and lemon groves of southern California, where in extreme cases, as in San Diego county, irrigation water is sold, not by the acre-foot or the cubic foot per second, or the miner's inch, but by the thousand gallons. Scarcity of water and the delicate requirements of high-priced products have altogether been the mother there of much invention in the field of irrigation practice. In the highly developed sections earthen channels for the conveyance of water have ceased to exist, even in farm distributing laterals, cement lined channels carrying the main supplied, and masonry or concrete ditches and flumes and concrete, steel, and vitrified clay pipes distributing the smaller streams to and over the farms. The water is measured to each main lateral or to each 10-acre or 20-acre grove with more accuracy than is usual in many other irrigated sections, usually by means of locally designed devices which, although not always as accurate as might be desired, are quite satisfactory. Excepting where the thousand gallon unit is used, as in parts of San Diego county, the 1-hour inch, costing from 1.1 cents to 3.5 cents, the 12-hour inch, costing proportionately, and the 24-hour inch, costing from 5 cents to 60 cents, and averaging about 20 cents, are common water units and charges.

The water supply for southern California irrigation, although derived in considerable part from direct flow or storage of surface streams, comes in very large part from wells tapping subterranean basins. Investigations, for instance, have disclosed about 300 irrigation pumping plants within a radius of about 5 miles from Pomona, and one of the subterranean basins in this section is so rich in water-bearing capabilities as to supply upward of fifteen fine wells on a single 160 acres, the largest wells recently drilled being 16 inches in diameter. In 1910 there were 10,000 irrigation pumping plants in all of California, a large proportion of them supplying water to orchards, and owing to the very dry seasons since then the number has since probably doubled.

The heavy and increasing draft being made on the underground water supplies of some sections of southern California has led to the necessity of underground storage of the canyon streams during flood periods, the flood flow being diverted into the extensive gravel beds that feed the pump supplies. To obviate the need of night irrigation, the water supply from both ditches and wells is very frequently run into concrete reservoirs, from which an extra-sized head can be drawn during the daylight hours. These small reservoirs, costing around $1,000 or $1,500 are a very common part of the irrigation equipment of some sections.

After earthen farm ditches were abandoned in southern California, the first substitutes used were common wooden flumes of 1-inch by 12-inch material. While occasionally one of these old flumes persists, first the cement flumes and then the underground pipes have taken their place. Concrete head-flumes, costing around 25 cents per linear foot, are now chiefly used on the steeper slopes, largely because water can be more easily delivered from them to contour furrows without washing than from the stand pipes of the underground systems. Attempts are seldom made now, however, to carry these concrete flumes over depressions, although this was done some formerly. Where the flumes are used, openings are made in them opposite to each orchard furrow and various forms of checks or other obstructions are placed across the flumes just below each outlet in order to give an even distribution. Where parallel lines of these concrete head flumes cross an orchard at intervals of 300 or 400 feet, depending on how long it is desired to have the irrigating furrows, each opening is sometimes numbered so that the attendant walking along the lower ends of the furrows may identify and make note of the furrows that seem to be getting too little or too much water and then later turn more or less water into these furrows. Sometimes a masonry-lined ditch follows along the upper side of the head flumes, collecting run-off from the upper rows of furrows and carrying it to points of use lower down, possibly also, on infrequent occasions, carrying off surface wash from short heavy rainstorms.

The application of water in furrows in southern California has come to be effected in some instances with a high degree of skill. As in the deciduous fruit districts of Santa Clara valley and about Yuba City heretofore described the first orchard irrigation in southern California was by the basin flooding method. The soil puddling and baking, the poor percolation and aeration, and the high evaporation losses connected with this system were, however, very early discovered and the system almost wholly abandoned for furrow irrigation. In an occasional instance, where an orchard tract has not been properly levelled before planting, and on very porous soils, and quite largely in walnut orchards, basins are still used, an orchard with a slope of 4 or 5 feet in 100 recently having been seen being irrigated in this way in the rolling area about Glendora.

In a nut-shell, the best southern California practice in furrow irrigation of orchards has come to include from two to four furrows 6 inches to 9 inches deep and from about 300 to about 500 feet long between each set of tree rows. On very sandy soils four or more feet deep, and on soils having a gravelly subsoil, furrows are close together as 3 feet are usual. This relatively close spacing is necessary because with light, open soils downward percolation, as already indicated, is much more rapid than lateral percolation. For the same reason, as between furrows 6 inches or 9 inches deep, for such soils the former are considered by some to be preferable.

Another requirement of sandy soils is that the irrigation furrows be short, not over 200 or 300 feet, depending largely on the slope. This is necessary to insure that the irrigation stream shall not run much longer at the upper end of the furrow than at the lower end, which it invariably does with porous soils if the furrows are too long. With a given slope, the only certain test for proper length of furrows is boring with a soil tube or auger. By this simple but effective

method percolation of water below the rooting zone at the upper ends of the furrows, and insufficient percolation at the lower ends, can both be prevented. The value of the use of such tools for finding out what becomes of the water applied to orchards is coming to be quite widely recognized, not only in southern California, but throughout the state.

Where soils are of such texture as to insure wide lateral percolation of irrigation water, furrows 8 inches or 9 inches deep are used under the best practice. These are made either with a special furrower or with shovel plows fastened to the frame of a sulky cultivator, about one day with man and team being necessary to prepare 10 acres. Shallow furrows in soils that readily absorb water laterally inevitably results in surface wetting, which is against every principle of good irrigation practice, as already emphasized, among other reasons, because it retards deep percolation by preventing free air passage in the soil, prevents early cultivation, puddles the surface soil, and results in much loss by evaporation.

In all furrow irrigation, two difficulties are met with which do not occur in basin flooding. One of these is to wet the spaces parallel with the furrows directly in the tree rows; the other is to prevent run-off at the lower ends of the furrows.

For wetting the space directly in the tree rows, zig-zagged around the trees, or checking the flow in the furrows nearest the trees so as to make it run fully across or to the centre of the dry space and back again, are the usual methods. It sometimes happens that orchardists cross-irrigate every other irrigation but this practice is not common in southern California.

For preventing waste of water at the lower ends of furrows some plan of checking or zig-zagging is necessary. Sometimes this is done only at or near the lower ends of the rows, and the irrigators' ingenuity must be relied on to decide how best to proceed. In some cases irrigators cross-furrow the lower quarter, third or half of the orchard.

The various forms of cross-furrowing or checking back are done exactly as when furrowing only one way, the necessary fills and cuts where furrows join being made with a small jump scraper or with a shovel.

The slopes given to furrows in southern California vary over a wide range, the soil texture and the size of stream's run necessarily being the governing factors. Sandy soils of course, require the greater slopes. Some advise planting trees on grades equalling the slope desired for the furrows; this is, substantially on contours. In the rolling foothill sections of southern California, especially in the younger orchards, this plan is quite largely followed. Where sidehills are steep terraces are not uncommon, and with their one tree row to the terrace are readily irrigated with one or more furrows and make a very attractive feature of an already attractive landscape. In ordinary soils some experienced growers consider a grade of 6 inches per 100 feet as a desirable maximum and advise contour planting and irrigation where necessary slopes with square or hexagonal planting, exceed that. But in this, as with nearly every other process of irrigation, practice must and usually does conform to the particular requirement of each orchard.

CONCLUSION.

Because the writer is unfamiliar, except by hearsay, with orchard irrigation conditions and needs in Western Canada, no attempt has been made in this paper directly to give advice as to the best practice to follow here. The purpose has been rather to familiarize you, by means of brief detailed descriptions and pictures, with the way some of the practical irrigation problems confronting you are dealt with in another western state. But by way of conclusion, it is desired to state a few of the principles California orchard irrigation practice seems to point to.

(1) No orchard can be well irrigated according to a book or a picture; such aids can only be suggestive. The first need is for each grower to know his own orchard below the surface as well as above it, especially as to the depth irrigation water percolates at different points in the furrows and as to the width of percolation from the furrows. A sharpened steel rod 6 feet long will indicate the depth of wetting while irrigation is under way, and an ordinary wood auger with the worm ground off, a 2-inch or 3-inch post hole auger costing $2 or $3, or a King soil tube, costing in the United States about $7.50, will, with little effort or expense, enable the intelligent irrigator to detect the need of moisture before irrigation or the extent and direction of percolation after irrigation.

(2) Excepting on very sandy soils, irrigation furrows 8 or 9 inches deep are invariably preferable to irrigation furrows 3 to 6 inches deep. The former facilitate deep percolation, which is desirable in most western soils, and prevent surface wetting, which is unqualifiedly bad practice.

(3) Irrigation furrows should not be so long that water runs more than an hour or so longer in the upper portion than in the lower portion. Flushing out the entire length of the furrows by using a double or triple stream in each furrow, when water is first turned into it, and until the entire length of the furrow is wetted, aids in even distribution. The tendency in good California practice is to cut furrow lengths down to 200 to 500 feet.

(4) The roots of most orchard trees under normal conditions, and where the trees are grown, reach throughout the space between the tree rows, and an irrigation is not thorough that does not likewise reach throughout that space. Boring 5 or 6 feet into the ground in different places in the irrigated orchard will show where the water has gone.

(5) A distinguishing characteristic of soils in western arid or semi-arid sections is that they greatly exceed the soils of humid sections in the amount of soluble plant foods they contain. Excessive irrigations, expecially it would seem by flooding, must eventually wash the soluble matter to lower depths where largely unavailable, as they have been washed by rains in humid sections. This is only one of many evils of over watering.

(6) The best distributing system of returns from an orchard will justify is a first requisite to good irrigation practice, for, to apply an old thought to a new theme, an orchard with water well distributed is half irrigated.

(7) The best irrigators do not seek a method of irrigating that will reduce labour to an unreasonable minimum. Labour intelligently applied to the application of water to an orchard soil represents money well spent. An orchard that

will not yield enough to pay for careful irrigation is not likely to persist. In the long run it certainly will not be profitable. (Applause.)

TUESDAY MORNING SESSION, AUGUST 18, 9.30.

CHAIRMAN: The meeting will please come to order. The secretary has a letter to read to the convention. The following letter was thereupon read:—

ASSOCIATED BOARDS OF TRADE OF
EASTERN BRITISH COLUMBIA.
OFFICE OF THE PRESIDENT,
NELSON, B.C., August 13, 1914.

EDGAR W. DYNES, Esq.,
Local Secretary, W.C.I.A.,
Penticton, B.C.

DEAR Mr. DYNES,—I have refrained from accepting the kind invitation you extended to me to be present at the convention to be held in your city on the 17th to 19th of August, not knowing for certain if I should be personally able to attend—this pleasure, I regret to say, I have to forego. I regret my inability to be with you, but desire to wish you a successful meeting.

Yours faithfully,

FRED. H. STARKEY.

CHAIRMAN: The first item on the programme this morning is an address by Mr. J. W. Eastham, Provincial Pathologist, British Columbia Government. His subject is

MOISTURE CONDITIONS IN RELATION TO PLANT DISEASES.

Mr. EASTHAM: Mr. Chairman, ladies and gentlemen,—The diseases which affect plants are of two kinds. On the one hand we have those which are due to parasitic organisms which live and grow in, or on, the tissues of the host plant and produce injuries of varying extent and degree. This may vary from nothing worse than a slight swelling (hypertrophy) of the part attacked, up to total death of large areas of the whole plant. These we may term parasitic diseases or diseases due to the presence of a parasite. On the other hand we have a class of injuries which are not due to the agency of such organisms but to some disturbance in the internal processes of the plant, and resulting, primarily, from varying external conditions of moisture, temperature, food materials, etc. Some workers would restrict the use of the term "disease" to the effect of parasitic organisms, and not apply it at all to the conditions brought about by variations in these latter factors, and indeed it is hard to draw a line between those results of variations in conditions which can be termed "disease" and those which cannot. An example will make this clearer. A plant which is exposed to a hot, dry atmosphere and, at the same time, insufficiently supplied

with water to its roots, will have its growth checked and, if the conditions are continued, will ultimately die. Such a plant, however, cannot be said to be diseased. In other cases, however, where the conditions do not affect the plant so unfavourably as to cause general death, we may find that certain parts of the leaves may be killed. We not infrequently find that the tips and margins of the leaves die and wither up, and that brown spots appear in those parts of the leaf furthest from the vein, and thus not as well supplied with water. Such effects may be observed on shade trees, especially maples, or orchard trees like the apple and the pear, and the common trouble of potatoes called "tip-burn" is of a somewhat similar nature. The cause of these injuries is essentially the loss of water from the cells, resulting in their death, but the effect is such as to be commonly termed, though hardly correctly, a "disease". In the case, however, of such apple troubles as "fruit" or "bitter-pit" and "water-core" we have definite and well characterized injuries produced as a result of certain conditions of growth together with, or influenced by, external conditions of moisture, temperature, etc. without the action of any parasite. Yet one can hardly refuse to consider "fruit-pit" and "water-core" diseases. It would seem almost as unreasonable to maintain that cancer in human being will not be a disease if it is finally established that it is not due to a parasitic organism. Without, therefore, defining a disease in any very precise way, we may use it for our purpose in its general and wide sense, and for further consideration we will classify diseases into two groups.

1. Parasitic—due to the injurious action of minute parasitic organisms, chiefly fungi and bacteria.

2. Physiological or Non-parasitic—due to disturbances in the natural internal processes or functions of the plant as a result of unsuitable external conditions.

Parasitic Diseases.—These are due mainly to two classes of organisms, fungi and bacteria. As a type of disease caused by the former we may take the common Scab or Black Spot on the apple, due to the fungus Venturia inaequalis. The first infection of the season occurs from minute spores produced in old leaves infected by the fungus last year, and kept moist at, or near, the surface of the soil. These spores are liberated about blossoming time, and carried by air currents to different parts of the tree, e.g., the flower stalks, leaves, etc. Each of these spores which falls on a young and tender portion of the tree may develop into a mycelium or fungus plant provided the conditions are right. One of the conditions, however, is a sufficient supply of water to enable the spore to germinate and produce an infection thread; this process will take at least twelve hours, and if a germinating spore should become dry before the germ has effected an entrance into the tissues of the host plant, it will be killed, and infection from it prevented. The amount of moisture present therefore on the tree at this stage, will largely determine the extent of infection, while repeated rains and humid atmosphere will intensify the effect, since the spores are not liberated all at once, but successively, for upwards of a month. In some cases almost the entire crop may be lost through the flower stalks being infected at this season and eaten away by the disease. The Mycelium at each infection spot will grow and develop and after a period of one to fourteen days, a crop of spores;

these will be scattered on the leaves, fruit, etc., and continue to spread the disease if conditions are right. Here again the presence of sufficient moisture is essential for the germination of the spores. With a dry season there will be little new infection, with wet weather infection may continue with susceptible varieties till comparatively late in the season. The relation between the prevalence of this disease and the rainfall is well seen by a study of its distribution in this province. In the Coast sections, scab is quite prevalent on apples and pears. In the Okanagan where the rainfall is ordinarily from 9 to 15 inches, it ceases to be troublesome in normal season, while in the Kootenays where the annual rainfall is greater, the disease reappears. Last year the season was unusually wet in the Okanagan district, and scab being unexpected, and measures not being taken against it, considerable damage from it resulted. I believe however, in most parts of the province, two sprayings are generally sufficient to control it, one a little before the blossoms open and one just after the petals fall, this is no doubt owing to the small rainfall during the summer, and is a striking contrast in, e.g., the Annapolis valley, Nova Scotia, where five or six sprayings may be required owing to the humid atmosphere, frequent rain and the presence of fogs. A case of somewhat different nature is found in the Peach Leaf Curl (*Exoascus deformans*). It is well known that a cold wet spring much increases the severity of this disease, so much so that many growers maintain that meteorological conditions are the sole cause. In this case, as in the preceding one, moisture is necessary for the germination of the spores, but the peach tree is only susceptible during one stage in its annual growth, namely, when the young leaves are just being exposed by the opening bud scales. Wet weather at this stage secures the conditions for the fungus to develop while if the spring is also cold and backward, as is very often the case when the weather is wet, the time taken for the buds to get through the susceptible stage is longer and therefore infection is likely to be much more severe. There is in this mount another rather interesting illustration of how moisture conditions may influence fungus infection. Here are two leaves of the common round-leaved mallow affected with Hollyhock Rust (*Puccinia malvacearum*). In the one case, the spore masses of the fungus are distributed over the entire surface of the leaf, in the other they are restricted to a few of the teeth along the leaf margin. Each of these spore-pustules probably represents a separate infection. When the infection is general, there was no doubt sufficient moisture present on the entire leaf to give the spores scattered on it a fair chance to develop. In the other instance, spores were probably present as in the former case, but only a few developed. We know that during the day there is much evaporation going on through the stomata of the leaves and a constant stream of water passing up the conducting system of the plant to replace this. With night fall the air cools more rapidly than the soil with the result that evaporation diminishes more rapidly than root-absorption. As a consequence the pressure in the vessels often becomes so great that small drops of water are forced out at the edge of the leaf close to where the vessels terminate. Such exuding drops of water have no doubt served to furnish the conditions of germination for spores of the rust and infection have taken place at these points.

The conditions for infection just given hold for most cases of fungus diseases, though there are just some exceptions, notably certain of the Powder Mildews which seem to thrive well and extend their infection rapidly even in very dry weather. In such cases there may be a perennial mycelium to serve as a starting point and probably also the spores germinate very rapidly On the whole, those districts where irrigation is required, but carried out judiciously, are very free from fungus diseases and if these were the only diseases to which crops are liable the lot of the grower in the dry belt would be a favoured one. As already mentioned, however, bacteria may also be the active agents in causing plant diseases and the way in which such diseases are spread is usually very different. Even the more delicate parts of land plants are generally covered by a thin but tough and resistant membrane, called the cuticle, and bacteria have usually no power of penetrating this, yet to cause disease they must enter the tissues of the plant and this can be only affected at the places where the cuticle is not developed or where it has been broken or injured in some way. In the former case infection may take place through the stomata, as in the case of Bean Blight (*Pseudomonas phaseoli*) through water pores as in the Black Rot of crucifers (*Pseudomonas campestria*) a method exactly comparable to that in the Hollyhock Rust specimens just shown or through the nectaries of the flower as in the Fire Blight (*Bacillus amylovorus*). Since Fire Blight is the most serious disease of orchards in British Columbia, at the present time it will be of interest to consider briefly how its development may be influenced by moisture conditions.

The starting point of the disease in the spring is the renewed activity of such bacteria as have been able to survive the winter in "hold-over" cankers. The evidence of this activity appears in the enlargement of the cankered areas and in the production of a gummy exude charged with bacteria. The exudate is the means by which the infection is carried to the blossoms but its amount and virulence are largely influenced by weather conditions. The amount of exudate, other things being equal, will depend upon the flow of sap, and therefore on soil moisture and temperature, but after it has begun to appear the atmosphere conditions may do much to diminish its powers of infection. The bacteria are carried to the blossoms by insects coming to suck the exudate. In a warm dry atmosphere it will dry up rapidly and when in a dry state offers little danger. Not only so but the bacteria are very sensitive to the action of bright sunlight. It has been demonstrated that where bacteria in a transparent medium are exposed to bright sunlight they are killed in four hours. We, see, then, why moist, cloudy weather is so favourable to blight infection, since the exudate remains liquid and virulent. After blight bacteria have been transferred to a blossom they multiply with great rapidity in the nectar and an insect subsequently visiting such a flower may carry the disease to many other blossoms. Weather conditions may have an influence on this phase of the disease where the germs are spread from blossom to blossom, but it is a little difficult to estimate it and I do not know of any actual observations or experiments on the subject. Dry weather will tend to dry up the infectious material adhering to an insect. Bright sunlight will also tend to kill such germs and to retard the development of them in the honey-glands. It is also known that dry weather at blossoming time decreases the amount of honey secreted, which in the case of an infected flower

Regatta at Penticton, B.C. •

would mean less infected material, but on the other hand a bee would visit more flowers on any one trip and if it had previously become contaminated with disease germs it would possibly be able to infect more flowers. However, on the whole there is very little doubt that dry, sunny weather is unfavourable to the spread of the infection from blossom to blossom.

In the later stages when the bacteria have obtained entrance into the fruit spurs and twigs and the disease is actively running it is well known that atmospheric conditions have a marked effect on the progress of the disease; warm, moist, cloudy weather favouring it and bright dry weather checking it. Since most of the bacteria work near the surface of the twigs it is probable that the direct penetration of the rays of light into the tissues is sufficient to retard their activity. Sunlight also retards growth, making the tissues firmer and thus less easily invaded by the organisms, and stimulates transpiration so that the tissues are not so likely to be surcharged with sap. Weather conditions will have the same effect on new infections at this stage as in the first stage of the disease. Wet weather when the blight is running may much increase the difficulty of control work. The exudate may be washed on to other parts of the tree where the punctures of insects or abrasions of the bark, may afford good opportunities for fresh inoculations. In some seasons the cutting out of blight may in this way be rendered very unsatisfactory, since the disinfectant is rapidly washed off the cut surface and re-infection may then take place. Similarly in moist weather it is important to remove and destroy the cuttings from diseased trees as soon as possible and not let them lie under the trees as the infection may be carried back to the trees by insects. In hot, dry weather this is not nearly so urgently required, since the exudate and infected tissues rapidly dry up. From what has been said it will be seen that the atmospheric conditions which obtain in the irrigation areas of British Columbia are almost as unfavourable to blight as to fungus diseases, but yet the fact remains that Fire Blight is very destructive in these districts. There are, I think, three reasons for this:—

1. A considerable proportion of very susceptible varieties, such as Spitzenberg and Transcendent crabs, have been planted.
2. Most of the trees are young and the disease spreads more rapidly in them.
3. The progress of blight in a tree is more influenced by the sap contents of the tree than is the case with most fungus diseases; hence over-irrigation or forced growth may more than outbalance the effects of a dry atmosphere. The application of an excess of water may directly affect the multiplication of the bacteria and the consequent spread of the disease through the tissues. The bacteria live chiefly in the inter-cellular spaces, and one of the conditions of their multiplication is the presence of a sufficient quantity of moisture; the more the cells of the plant are overcharged with moisture, the more readily will this be obtained by the bacteria, while it is also probable that the dilution of the cell contents will diminish the resistance of the cells to the killing action of the germs. With an increased supply of water the activity of the bacteria often increases very noticeably. Fire Blight may be moving very slowly or be almost checked in late summer but after turning on the irrigation water,

the disease may once more become active again, at any rate in the more susceptible varieties.

It is a well known fact in the East that a cultivated, well-cared-for orchard, with trees making good growth, is much more likely to suffer through blight than one in sod where the trees are not making the same growth. The contrast is still greater where growth is forced by over-irrigation. In such trees the excess of water present favours the rapid multiplication and spread of the blight organisms in the tissues so that the disease progresses rapidly once the tissues have become invaded, but not only so but infection is also more readily produced. Where the tissues are comparatively dry and woody, bacteria introduced into a minute wound may dry out and die without giving rise to an infection, whereas in more succulent tissue there would be sufficient moisture to give the germs the necessary start. In the case of a tree which has been inadequately supplied with water and fertilizer, it is often difficult to get an artificial infection even with a vigorous culture of the blight bacillus, except in the early spring. The first growth of such a tree does not differ materially, however, from that of better-cared-for trees, and hence we may find infections taking place in the early growth although, owing to the rapid hardening of the tissues the disease soon dies out. In general, it may be said that the nearer the quantity of water applied approaches the minimum required for a reasonable amount of growth and the maturing of the crop, the more effectively will blight be controlled.

PHYSIOLOGICAL OR NON-PARASITIC DISEASES.

Diseases of this nature are amongst the most difficult to investigate since they do not depend on the presence of a definite organism, but on the balance being disturbed between the different processes going on in the plant; this again, is brought about usually by variations in the external conditions and as these do not usually vary one at a time it is often a difficult matter to estimate the relative importance of each.

Two of the best known diseases of this type are the Water Core and the Fruit-Pit, to which the apple crop in particular is liable.

Water Core well illustrates the fact that several conditions together may be necessary to bring about a disease. Healthy plant tissue consists of living cells which do not fit tightly to one another over their whole surface, but have numerous cavities between, which communicate with one another. Ordinarily these cavities are filled with air, forming as it were, a breathing system for the cells. If the sap-pressure in the cells becomes too great, water is forced into the air spaces until the entire inter-cellular space in a given area is filled with water instead of air. This is exactly what happens in Water Core, the glassy, water soaked appearance of the tissues being due to the replacement of air by watery sap, while, if the disease is very bad, quantities of liquid may be forced into the seed-cavities, which has led to the name "Water Core."

The work of Mr. P. J. O'Gara has shown very clearly the associated conditions which may give rise to Water Core. The three most important ones are:

1. High water-content of the soil. In particular, heavy rainfall, or irrigation just before the fruit is mature. This provides the water supply for a rapid flow of sap.

2. Clear bright weather with high temperature during the day. This promotes active transpiration.

3. Marked difference between the day and night temperatures. This is the decisive factor. It is apparently not unusual for the difference between the maximum and minimum temperature during the twenty-four hours to be 40° F., or more. The result of this fall in temperature is to bring the air nearer to saturation point and thus greatly check the loss of moisture from the leaves and fruit. At the same time the temperature of the soil does not fall so rapidly and the roots continue to actively force water up into the tree. Evaporation being checked, the internal pressure of the sap gradually increases, and since the cells in the maturing fruit are less resistant, sap is ultimately forced out into the air spaces, which is the beginning of water-core. With repetition of the same conditions the disease becomes gradually worse.

The active cause then, of this disease is a wide difference between the day and night temperatures, while an essential condition is a plentiful supply of moisture in the soil, excessive irrigation or precipitation, when the fruit is ripening particularly favouring the disease.

Fruit Pit, also called Bitter Pit and Baldwin Spot, is probably sufficiently well known to those present to render any description of it unnecessary. An address on the subject was also given at the Irrigation Convention at Kelowna in 1912, by Mr. M. L. Dean, in which our knowledge of the control of the disease was practically summed up in the statement that "the system which promotes a uniform normal growth of tree and fruit throughout the entire season is the best antidote."

This perhaps, does not sound very definite, but, from the nature of the disease, it seems very unlikely that anything in the nature of a specific for it will ever be obtained. In Australia the disease is of such consequence that in 1911 Mr. D. McAlpine, one of the foremost plant pathologists in the English-speaking world, was appointed by the Commonwealth Government to give his whole attention to the disease for a number of years, or until a solution of the problem has been obtained. Two progress reports have been published but, owing to the complexity of the problem and the number of factors which may affect it, no great addition has yet been made to our powers of controlling the disease on the tree. It is known, however, that the relation of moisture to the disease is an importamt one and that the character of the season has much to do with the prevalence of the disease. Drought is commonly considered to be one of the main causes, but this cannot be the only one or we should not find it serious on properly irrigated land. It is much more likely that marked fluctuations in the available water supply, resulting in a spasmodic growth of the fruit, are to blame. Mr. McAlpine has made a very careful study of the conducting system by which the sap is distributed through the apple fruit. Towards the outside of the fruit this forms a network of innumerable small meshes. The regularity of this network is largely dependent upon a regular and not too rapid growth. Should there be an excess of sap and a forced growth at certain times while the

fruit is developing, some of the meshes of this network will either not be formed or will be broken down. As a consequence certain masses of cells are very unfavourably situated later on for obtaining a sufficient supply of moisture, and, as a consequence, they die and form the pitted spots. It is probable that a certain amount of irregularity in the manner of growth is inseparably connected with irrigation, but there is no question that whatever tends to keep the moisture content of the soil uniform will tend to diminish Bitter Pit. (Applause.)

CHAIRMAN: We can now devote some time to discussion, if there are any points you would like to bring up or questions you may wish to ask.

Mr. HOOKER: With respect to Fire Blight, it has been advocated that bees be kept in an orchard. I would be interested to know your opinion as to the advisability where there is danger of blight, of keeping bees in connection with the possible spread of Fire Blight.

Mr. EASTHAM: The bee is simply an agent in the transmission of the disease. Provided the cankers are cut out in the winter time, there will be very little exudate to be carried by the bees. The bees are almost essential for the proper pollenation of the blossom. I don't know of any observations which show there is a relation between the prevalence of Fire Blight and the number of bees. I think emphasis should be laid upon cutting out all dormant cankers.

Mr. BULMAN: With regard to Water Core, I should like to know whether there is any hereditary tendency in trees of the same variety?

Mr. EASTHAM: I don't know that I have any data with regard to the comparative prevalence of Water Core in the same variety, but there is a very marked difference in different varieties and there is also quite a difference in the condition of the tree. A tree growing rapidly and having a large amount of sap would be more likely to have Water Core than one growing slowly; also one with a light crop would be more likely to have Water Core than one with a heavy crop.

Mr. TAYLOR: Have you any information about experiments carried out in Washington regarding the time bacteria will live after the branches are cut off? I understand that after being a fortnight on the ground in the sun, they became active after the branches had been put in water.

Mr. EASTHAM: If the bacteria get completely dried out, they will not retain their activity for more than nine or ten days. If the branches are left in an orchard, complete drying out does not always take place. Recent work has shown that bacteria are more retentive of life than hitherto supposed. Experiments were made with small blighted twigs which remained on the tree over winter till March and living bacteria were isolated from those.

CHAIRMAN: Before calling on the next speaker, we shall take this opportunity to ask Mayor Jones, of Kelowna, to make an announcement and give some explanations in regard to the details of the motor trip to-morrow.

Mayor JONES: Mr. Chairman, ladies and gentlemen,—Two years ago we had the pleasure of welcoming the irrigation convention to Kelowna, and the conclusion of the proceedings you came down to finish up at Penticton, by enjoying a splendid banquet tendered by the citizens. The closing expression of that convention I think was a very happy one, and it gives me great pleasure to meet you again. I think the splendid hospitality that has been shown by the people of Penticton and their magnificent greeting has demonstrated that your presence is greatly appreciated. We recognize that many of you have come from far away, and wish to entertain you to the best of our ability. Many of you come to us from the South, others from the western Prairie Provinces, so the people of Kelowna have commissioned me to extend to you a hearty invitation to stop off on your trip out of the valley. The steamer will stop at Kelowna at half-past eight for two hours. We have over one hundred automobiles to be placed at your service, and during that time will give you a drive through our many orchards and through our district, and will endeavour to show you something of one of the best fruit growing districts of the Okanagan valley. You have tested the quality of the Penticton peach, and we would like you to see if the Kelowna peach is its equal. We want to show you the largest onion and tomato patch in British Columbia and then the largest fruit-canning factory in British Columbia, and then we think we will be able to send you off feeling that the people of the Okanagan are no small fry. We will be very pleased if this Convention will let us know about how many can stop off, and we guarantee to get you back in time.

Mr. TAYLOR: May I make an announcement about Kelowna. There will be a meeting of the British Columbia Entomological Society at Kelowna on Thursday. We specially fixed the date in order that we might try and catch the entomologists and those interested who are here at this meeting. This meeting will deal entirely with the practical side of entomology as it concerns the fruit grower. It is an innovation, made last year. We had a very successful meeting last year in Vernon, about forty-five people attending, including one or two gentlemen from the States, who gave us very valuable assistance. The meeting is on Thursday next, at ten o'clock, at Kelowna.

CHAIRMAN: Any of us who were at Kelowna two years ago will have a very vivid remembrance of the way the Kelowna people can entertain and any of the delegates who can possibly take advantage of this motor trip should certainly do so. Mr. Dynes will explain.

The local secretary then stated that a telegram had been received from Mr. H. W. Brodie, the C.P.R. General Passenger Agent, Vancouver, to the effect that the Okanagan would be tied up for the convenience of the delegates during their stop at Kelowna, and delegates wishing to go expressed their thanks for the invitation of Kelowna by a standing vote. The local secretary also announced that photographers wished to secure photographs of the Convention at the conclusion of the session.

Mr. CRANDALL: Mr. Chairman,—It seems to me in connection with that, that there ought to be included an expression of thanks to be sent by our secretary to Mr. Brodie, and I would like to move that it is the expression of those who are experiencing the kindness of these arrangements that we convey to Mr. Brodie our thanks for the courtesy he is extending.

CHAIRMAN: The Secreatry will embody that. The next speaker will be Professor W. J. Elliott, Principal of the Provincial Agricultural School, Olds, Alberta, who is to talk to us on the matter of

EDUCATING THE FARMER'S BOY AND GIRL.

Prof. W. J. ELLIOTT: Mr. President, ladies and gentlemen,—Every once in a while the privilege is given to some keen thinker of bringing forth a new idea, and then everyone wonders why the idea was not thought out long ago, because it is so logically the common-sense thing. Such an idea came to the Hon. Duncan Marshall, Minister of Agriculture for the province of Alberta. Those who know Mr. Marshall will realize that he has, perhaps above everything else, a thoroughly practical knowledge of the thousand and one details of his very important agricultural branch. It suddenly occurred to him one day that if the lawyer had his own school, the doctor his school, the civil engineer his school, the school-teacher his school, then why not a school for the young man who is going to farm? Agriculture is the most important calling of all. It is the only real source of wealth, and if Canada is so utterly dependent upon the man on the land, then why not a school where he may learn a little bit more about the business that is to be his for life?

On first thought it might be claimed that the agricultural colleges are doing this thing, but we believe that a careful survey of actual conditions will reveal the fact that a large percentage of the graduates of our agricultural colleges prefer to go into professional life rather than to return to the farm. We, of course, do not criticize the colleges for this fact, for there is certainly a demand for professional men along many lines of agricultural endeavour. Nor do we blame the young man who, after graduation, finds some useful line of work that calls him off the farm. The fact remains, however, that many of our college graduates do leave the farm. Now, Alberta's farm schools which come directly under the Minister of Agriculture, are taking up the problem of helping the farmer's boy to help himself in a new way.

MANY FARM BOYS LACK EDUCATION.

It is a fact that in Alberta there are many young men who came to the new land of the West with their parents at a time when there were few schools, and at a time when the family purse was not stout enough to employ hired help. Thus the boy got very little or possibly no public school training after coming to the province. These facts are to be regretted, yet they are part of the price that is paid by the "pioneer boys" who give their lives to help their parents win a home for themselves.

Canadian Pacific Railway Company's Dam, Bassano, Alberta.

Alberta, like the rest of the provinces of this new Dominion, has literally thousands of boys who are to be our future farmers, and who are deficient as far as the public school standard is concerned. These boys range from 16 to 25 years of age. They will not go to the public school even though later financial success would make this possible.

We could not expect a boy of 20 years of age to stand in a class at the public school with a ten year old boy in knee pants. Then where can he go ? The high school standards will not admit him; the college hold their standards of admission above his head. The facts are, then, that the man who is to become the tiller of the soil and on whose shoulders the burden of Canada's prosperity must rest, will have to do without training. No, that will not be the case in Alberta.

ALBERTA'S SCHOOLS.

The Minister of Agriculture has established three schools of agriculture in the province that are primarily for the farmer's boy—for the boy who is to be the future farmer of the province. These schools belong to him. He has a right to go to them, and at them he meets others just like himself. There are no standards of admission, the only thing being a willingness and a conscientious effort to do on the part of the boy. The atmosphere of the school is an agricultural atmosphere, the instructors have the word "practical" written high and clear above every lesson that is taught. The idea of the education is first, to give the boy a clear view of the importance of his calling, so that he may grasp the idea that every business on the face of the earth comes second to that of agriculture. And, in the second place, the school seeks to give such information as will be useful to the boy as soon as he returns home. No lesson is given in the classroom that is not immediately followed by practical work in the laboratory, the stock-judging room, the seed testing room or the blacksmith and carpentry shop.

THE COURSE OF STUDY.

Prime importance is given to live stock, as the permanent success of western agriculture is wrapped up in this. The boys are taught to judge draft horses, dairy and beef cattle, the various types of hogs, etc., and while these animals are being discussed, matters are taken up with regard to the various Alberta feeds that are available and suitable. Next in importance to the live stock work comes the work of grain judging, weed seed identification and a thorough discussion of Alberta's soils and how to handle them. The iron and wood repair work is another very important phase of the education. A carpentry and black-smith's shop have been provided and all kinds of farm repairing work is done by the boys. They are first taught the use of both iron and wood tools, the care of a forge and fire, etc. The boys make door hooks and chains, make clevices, whiffle-trees, wheel barrows, and wagon boxes. This includes the cutting out and making the woodwork and the making and shaping of all irons for the same.

In addition to the above, the boys are given a thorough course in business English, and work in chemistry, physics, botany and such subjects as are directly

and closely related to agriculture. For instance, the boys are shown the cattle fed on the farm and learn that they receive certain proportions of oats and barley, cut-oat bundles and wild hay, The boys then go to the classroom and an instructor in chemistry shows them the same oats, barley and roughage. The chemical composition of each is discussed in terms of feeding cattle. The boy learns that to put fat on animals he must feed the starchy foods like barley and wheat, and that to produce milk the oat is the grain that is used above all others. In this way, the discussion of the composition of the feeds on the farm is so interwoven with the actual work that is going on on the Demonstration Farm that he becomes familiar with the ordinary feeds on an Alberta farm: and, without knowing it, is actually studying the chemistry of cattle feeding. It is just in ways of this kind that all of the lecture work of the classroom is made of actual value to the boy in a practical way.

ARE THE SCHOOLS WELL ATTENDED?

The natural question to ask is, "How were the schools of agriculture received by the farmers and the farmers' sons?" When the principals were appointed and the staffs were being called together last fall, the Minister of Agriculture suggested that if fifteen to twenty boys were received at each school, he would be entirely satisfied. The schools have certainly been appreciated by the farmer and the attendance of the boys has proven beyond the question of a doubt that these are the schools that the farmers want for the education of their boys.

In the three schools, 176 boys were enrolled for agricultural instruction. We doubt if there is a province or state on this continent that can show such a record. One hundred per-cent of the boys came directly from the farms. In this way it will be clearly seen that the agricultural schools are not encroaching upon the work of the public schools or collegiate institutes. They have drawn their students from a class of boys who heretofore have received no instruction. At the Olds school, thirty seven boys were registered the first day, and inside of two weeks a total of sixty-one boys were admitted. More seats had to be ordered and more equipment secured. Before Christmas the principals of the schools were advising the farmers not to send any more boys, as the schools had practically all that they could possibly handle.

Present indications would suggest that there will be in the neighbourhood of 260 boys at these three schools next winter. The school term only runs for five months in the winter, beginning October 27, and lasting until the end of March. At the present writing, the Olds school alone has received signed up applications from forty-two boys and eighteen girls from last year's class who wish to take a second year; and, in addition, thirty-three boys and six girls have registered for the first year. This makes a total of ninety-nine registered for next year's work at the Olds school alone. Indications are that by the time of the opening day the school will be refusing to register any more students. Indeed, the schools are regarded so highly by the farming communities that the Minister of Agriculture is literally besieged with delegations asking that additional schools be established at other points in the province.

HOUSEHOLD SCIENCE BRANCH.

In addition to the work that is given for farm boys, a course is offered in household science for the farmers' daughters. The course is not limited to farmers' daughters, because girls from the surrounding towns as well are taking advantage of the same. This branch covers a study of foods, sewing, cooking, laundry work, hygiene, sanitation, home care of the sick, and work in home gardening, poultry and butter making. Here again the work is made as practical as possible. Somewhat of an idea may be gained of the practical nature of the work when it is said that Mr. Pat Burns, the noted cattleman and packer of Western Canada, after going through the buildings, and seeing the boys and girls at work, declared that it was the most practical institution he had ever visited and offered on the spot $100 scholarships for the best stock judge, for the best grain and weed seed judge, for the best cook and the best lady sewer.

So apparent is the usefulness of the schools that already the Minister of Agriculture is planning large extensions in the way of buildings to accommodate next year's quota of students.

ADVANCED AGRICULTURAL COURSE.

It will be seen by the foregoing that the course as offered by the Alberta Schools of Agriculture is designed particularly for the boy who is going back on the farm. There, of course, will be a small percentage of students who wish to go on for more advanced work. The Schools of Agriculture, therefore, fit in with a regular continuous system of agricultural education in the province. The two years as given at the schools are about equivalent to the two years offered by Guelph and Manitoba agricultural colleges, with particular adaptation to western conditions. Students who complete the two years' course at one of the provincial schools will be admitted directly into an advanced degree course as offered by the Provincial University.

EXTENSION WORK.

The staff at each school is composed of thoroughly practical men, and during the seven months of summer when the school is not in session, these men devote their entire time to agricultural extension work. In short, this extension work may be said to cover any practical assistance to the farmers in the district covered by each school. It is needless to say that a good deal of this extension work is carried on through the farmers' sons who attend the school during the winter. The animal husbandry instructor has outlined a series of experiments to be conducted by twenty of the students along the lines of the summer feeding of hogs.

The agronomy instructor has an experiment outlined in connection with alfalfa, and approximately twenty of the students will undertake this experiment.

In addition to this, the students of the school have formed an experimental union, and under this union, a great many varieties of grains and grasses will

be tested out. The agronomy instructor of the school is the secretary of the union and will be in a position to give practical advice at all times.

COW-TESTING ASSOCIATIONS.

Cow-testing Associations are being started, and so great is the call for assistance in this line, that it will require the balance of the staff to visit the students and farmers once per month to weigh and test the milk of the cows that are entered in the cow-testing association. It is an interesting fact to note that twenty of the boys of the school and eleven of the girls have signified their intention of keeping the records of the herds at home, with a view to securing the advantage of the cow-testing association. It will thus be seen that the staff are kept directly in touch with the farming community surrounding each school.

CO-OPERATION WITH DEMONSTRATION FARMS.

A point that might be brought out in this connection is with reference to the co-operation between the Government demonstration farms and the schools of agriculture. The schools of agriculture occupy twenty acres of land on the corner of the demonstration farms. The balance of the land is handled under the direction of the Superintendent of Demonstration Farms, who conducts each farm as a more or less commercial proposition. Herds of dairy cows representing the various breeds and including milking shorthorns are found on each demonstration farm, and milk of superior quality is shipped to large centres like Calgary and Edmonton. The demonstration farms are not handled entirely in the way of experiment stations, but rather follow out the experiments of the various stations and test the grains, grasses, etc., in a commercial way. It is an interesting point to note that these demonstration farms are paying their own way, a thing that is perhaps very unusual with demonstration farms in the Dominion of Canada.

The students thus have a demonstration farm at all times run along ordinary farm lines and operated as a paying proposition. The instruction gained by observing the work as it is carried on is thus made all the more valuable. The manager of the demonstration farm gives instructions to the boys under the heading "Farm Management" and, needless to say, his talks are borne out by the actual work on the farm.

ECONOMY OF EQUIPMENT.

The school of agriculture does not need to carry an expensive equipment in the way of the various classes of stock for educational purposes. The stock that is used for judging purposes is just the ordinary stock that is carried on the demonstration farm. A team of horses may be drawing straw, ice, hay, grain or anything on the farm, and at noon the harness is taken off them and they are sent to the stock judging room for the use of the students. In this way, the operation of the schools of agriculture is very much less expensive than it otherwise would be.

It might be added that of the twenty acres under the supervision of the schools of agriculture, about fifteen are set aside for experimental plots, where the various classes of grain, grasses, shade trees, shrubs, fruits and berries, are tested out in the interests of the farming community. All those who visit the demonstration farms and the schools of agriculture are high in their praise of the practical nature of the work that is given to the students and of the useful information and help that is available for the farmers living within the district covered by one of Alberta's schools of agriculture. (Applause.)

CHAIRMAN: There is one item I think Professor Elliott omitted and that is, the amount of the fees for the course.

Professor ELLIOTT: I said that the school is handled by the Minister of Agriculture and so is entirely free. There are no fees of any kind in connection with the school. The school provides all wood, all ironwork and everything in the household science department. It will cost us next year one thousand dollars to buy iron, wood and equipment. The boys must provide their board and room while attending, which averages four and a half to five dollars a week. The books cost, perhaps, five to six dollars. Each student is asked to deposit five dollars as caution money. We give them an equipment to work with during the term. This amount covers breakage or loss during the year and is returned if nothing is broken or lost.

Mr. RANKIN: I understand, Professor, these students do not live in the college. Might I ask how you control them; how you keep a check on them?

Professor ELLIOTT: We have no dormitory in connection with the school: that may come later on. Every home where the students board must register with me. I have a registration of every home and I get weekly reports from those homes with regard to every student. If he is found not attending, he is immediately sent home, because the school will be crammed to the doors anyway, and the boys know that. I want to tell you this though, gentlemen, if you will pick up a hundred boys from the farms of anyone of the western provinces, you have got a pretty decent lot of boys. (Hear, hear.) In all the work I have ever done, I have never met a class of boys I have had as little trouble with as the boys and girls at the Olds School of Agriculture. We have a students' government and the boys elect their own president and cabinet, in which all branches of the school are represented, and matters of discipline are turned over to the cabinet to deal with.

Mr. RANKIN: How many have been expelled?

Professor ELLIOTT: We caused one to be expelled last year for drinking. That is something we will not allow under any circumstances. (Applause.) We go so far as to prohibit smoking on the campus or in the building. (Applause.) The boys and girls are required to attend the church of their choice once each Sunday, and all these things have a mighty wholesome effect on a

student body. Last year we had only the one case of a boy sent home for the one thing we will not stand for above everything else, and the other two principals will say the same thing.

Mr. DONALD CAMERON: There was one thing I did not hear very much about in connection with manual work, which is daily receiving more recognition and would constitute what Mr. Smith might call diversified education. There is one notable case that is not very well known where it was suggested that the boys receive so many days a week of manual training. At that time the girls were ahead of the boys as they usually are at that time of life and the governors were quite prepared to find the boys would still drop further back, but to their amazement they found them ahead of the girls after they had been spending so much extra time in this way. The girls then received the same opportunities and soon regained their position. It shows that if boys are taught in that way, it is a great help to them. The subject must be taught so that the boy takes pleasure in it. I should like to know if he is taught book keeping?

Professor ELLIOTT: We have had Mr. F. M. Black, Chief Accountant for the Pat Burns Company, Calgary, and Mr. James Elliott, Private Secretary to Doctor Rutherford, prepare a practical system of book-keeping for our boys. The chief difficulty with book-keeping systems is, that they are too elaborate. We are having a system devised just as simple and practical as it can possibly be, so that the boys may have an idea at the end of the year just where he stands in connection with his work. That work is taught, sir. We also have social features which we control ourselves. From our school last year we sent a debating team out that went up to the semi-finals of the province—farm boys who had neglected their education, who were enabled to carry the team up to the semi-finals of high schools. (Applause.)

CHAIRMAN: Mr. H. W. Grunsky, of the Water Rights Branch of the British Columbia Government, will now address the convention on the subject.

FEATURES OF THE BRITISH COLUMBIA WATER ACT

Mr. W. H. GRUNSKY: Mr. Chairman, ladies and gentlemen,—In comparison with the water legislation of other western states and provinces, the Water Act of British Columbia holds a unique position. It can be said without fear of contradiction, that in the legislation of no single state or province is there found a code dealing with all the various uses of water whose parts are so well co-related or whose character stands so consistently for advanced conservation principles as the Water Act of British Columbia.

The act is practically a product of the past twenty years. From the time when the first settlers came to these far western shores in quest of gold and other precious metals, a few brief clauses were put into the statute books and rules were adopted governing the acquisition of "ditch privileges" as they were called. These same clauses and rules formed the nucleus around which were developed the later Water Acts, yet they were framed to meet the needs of a

J. A. Cammaert's irrigated alfalfa, 2nd cutting, August 5, 1914, Strathmore, Alberta.

more or less unstable mining community, and were not at all suited to the exacting requirements of modern times.

The task of consolidating into one unified Act all the various clauses pertaining to the use of water was begun in 1897. Prior to this time, a man desiring a water right could simply walk into the Government office and cause a record to be made in his favour for almost any quantity of water he might name, regardless of whether the stream was capable of supplying such quantity; and regardless of whether the applicant could show that he could beneficially use such quantity on his particular land or mine, or in respect of his particular undertaking.

There were already at this time thousands of old records in existence, many of which had been imperfectly issued, throwing doubt upon the validity and extent of existing water titles.

In the Consolidated Act of 1897, the principle of making every right depend upon continuous beneficial use was strongly expressed, and water recorders were given power to cancel records for non-use.

The procedure adopted in this Act, however, did not produce the results expected; and in 1909, under the capable leadership of the then Minister of Lands, the Hon. F. J. Fulton, an Act was passed, which for the first time met the issue squarely. A board was created which should devote its entire time to the investigation and determination of rights held under the old records. The procedure of granting new rights was also revised and improved.

The scope and fundamental principles of the Act of 1909 have not been materially altered by amendments passed in the years 1910 to 1913, the principal change made in these years being such as were suggested in the course of administration and as seemed necessary to the proper working of the Act.

Coming now to the "Water Act of 1914," in the brief time at my disposal, it will be impossible to discuss more than a few of its main features; but if, in going over these few points, I can impress upon the members present something of the spirit of the Act, and of the relative position which it holds among the water Acts of other western jurisdictions, I shall feel amply repaid.

There are two main parts to the new Act: nearly one-half dealing with companies, associations, and bodies corporate, which may be formed for the carriage of storage of water, including public irrigation corporations. The other half is the old Water Act with its amendments consolidated and revised. Incidentally, I may say that in revising the old Act, it was reduced in size about twenty per cent.

As there is already some published matter dealing with public irrigation corporations[1]; and as that part of the Act is not of such wide application in the province as the Water Act proper, I will confine my attention this afternoon to the general features of the Water Act proper.

ADMINISTRATION.

The administration of the waters in British Columbia is shared by the Minister of Lands, the Comptroller of Water Rights, the Engineers of the Water Districts, and the Board of Investigation.

[1] "Report on a Public Irrigation Corporation Bill" by H. W. Grunsky. Copies may be had by addressing the Comptroller of Water Rights, Victoria B.C.

The Comptroller is the Administrator-in-Chief of the Water Rights Branch. He receives applications, examines and approves plans, issues water licenses, and generally passes upon all matters of an engineering nature. He has authority over the engineers of the water districts, who directly supervise the distribution and use of water and from whose every decision there is an appeal to him. There is likewise an appeal from the Comptroller to the Minister whose decision is final.[2] The Comptroller is ex-officio a member of the Board for all purposes except the adjudication of rights held under old records.

The Board of Investigation, whose sole duty under the 1909 Act consisted in investigating and adjudicating upon old records, has had its sphere of action considerably enlarged under the later Acts. Matters pertaining to the amendment of licenses which have been imperfectly issued, and generally such other matters as affect the title of the licenses come before the board. There is an appeal from its decision on these matters directly to the Court of Appeal of the province. Then there is another class of matters respecting the operation of licensees who are engaged in making a profit from the barter and sale or the carriage of water or power which come before the board with an appeal directly from its decision to the Minister.

Up to 1912 water-licenses in British Columbia, like the old records, could be issued by the local water commissioners. This plan did not work well and in that year an important change was made. While certain preliminary proceedings, such as posting notices, advertising, filing objections and so on, were still to be carried on at local points and while the hearing on the application might still be held locally before the water recorder or some person appointed by the Minister, the actual decision on the application was to be made by the Comptroller and license issued by him.

This centralization of the administration governing the acquisition of rights was a big step in advance over the old method. It insured uniformity and accuracy in the records; it also insured that the granting of a water privilege, no matter where located, and no matter whether large or small, could only be accomplished after the careful investigation and comparison by the Comptroller himself.

DISTRICT ENGINEERS.

While there must be central authority to deal with the granting of licenses and with the larger legal and engineering phases of the water question, it is very clear that if a close supervision over water diversions is to be exercised, there must be a local arm of the water branch in every important district in the Province. If a difficulty arises between water users there must be an engineer near at hand, who is capable of settling the difficulty. Prior to the last year the only officials representing the Water Rights Branch locally were the "water recorders." These water recorders, however, were primarily office men and had

[2]Colorado also permits an appeal from the decisions of the district engineer to the state engineer. Revised Statutes, Colorado, 1908, s. 3433. Oregon and Wyoming permit an appeal from decisions of the state engineer to the Board, and, in case of Wyoming, a further appeal may be carried from the Board to the Courts. Statutes of Wyoming, 1910, s. 733 and 779. Oregon Laws 1909, c. 216, p. 333, s. 49, Do, s. 51, Do., p. 326 s. 26, being sections 6627, 6631 and 6650 of Title XLIII. Lord's Oregon Laws.

no technical training in water matters, so the system failed to give satisfaction. Under the present Act all this is changed; the district engineers now have their headquarters at local points. The result has been most gratifying; streams are being measured, the central office is being kept in touch with local conditions in every part of the province, while on the other hand, licensees are learning something of the aims of the Water Rights Branch; water troubles are being gradually dissipated and there is a better feeling everywhere.

UNIFORMITY OF PROCEDURE.

Under the present Act there is just one chapter on the procedure for obtaining a water license, and that covers the steps to be taken by every applicant, no matter whether the water is to be used for domestic consumption, for the irrigation of land, for the development of power, for the floating of logs, or for some other use. A little variation is made here and there to suit the special needs of applications for each purpose, but the main variation depends whether the use to be made is large or small, and upon whether the applicant is to use the water or power upon his own land or is to engage in the business of sale to others.

The steps required may be briefly summarized:—First, the applicant must post notices in conspicuous places in the locality where the water is to be taken and used; next, he must, without loss of time, file a similiar notice in a local Government office, and, in the most cases, must publish it in a newspaper circullating in the locality; then, within a brief time, the application proper, accompanied by a sketch, must be filed in duplicate in the local Government office. One copy of this application and sketch goes to the Comptroller, who notifies the applicant by letter of any further information which is required to put his application in good standing. Ample time is allowed for the filing of objections by interested persons, and a hearing is held, if necessary; then, if detail plans are considered necessary, the Comptroller may grant an authorization to make surveys, and within a stated time the requisite plans must be filed. The Comptroller examines the plans and, if satisfactory, approves them and issues the conditional license.

The conditional license is really an authorization to construct works and licenses to use water pending the time when the works shall be completed. Suitable procedure is afforded for the taking of such lands as may be necessary for the construction of works.[1] The application is held down to a definite time within which he must commence construction and bring the works to completion. To protect settlers whose lands are covered with timber it is held that the clearing of lands is made equivalent to a commencement of works.

The time given for the completion of the works is usually liberal but can only be extended if the applicant satisfies the Comptroller by statutory declarations that he has begun and diligently continued the work in good faith and has been prevented by causes beyond his control from completing it and making beneficial use of the water.

When the applicant makes his declaration of completion of the works (supported by the declaration of at least one credible witness), the Comptroller

[1]See the definition of "works" section 3.

either in person or through one of his engineering staff, makes an inspection and if he finds everything satisfactory a final license or water patent is issued, giving a right to the extent to which beneficial use has been made of the water and no more.

SMALL APPLICATIONS FACILITATED.

It is very plain that the applicant whose contemplated use of water is relatively small (called under the Act a "Class A" applicant) cannot be expected to fulfil the same requirements as an applicant for a larger privilege. Therefore the Act provides that in such case the Comptroller need not call for surveys or detail plans, but may, after the time for filing objections has expired and after being satisfied that there are no valid objections to the application, grant a license to the applicant forthwith. The application it will be noted is in all cases accompanied by a sketch or plan, but this sketch or plan need not necessarily be drawn to a scale.

In the matter of publication the smaller applicant is also favoured, the Comptroller is allowed to grant dispensation from advertising when the application is for mining purposes for not more than eight cubic feet per second or for domestic purposes and not more than 500 gallons per day, if he is satisfied that all parties whose interests might be prejudicially affected have had actual notice.

PUBLICITY.

In no other jurisdiction, I think, is the same amount of publicity required of intending applicants for water rights as in British Columbia. This may, in some cases and for the time being, work slight hardship upon certain applicants; but it satisfies the public and makes for good administration and in consequence there is no such thing as getting away with a water license in the dark in British Columbia. As already shown, the tendency of recent Acts has been to lessen somewhat the amount of advertising required of the smaller applicants.

The states of Wyoming and Oregon require no advertising at all, leaving it to the state engineer to discover, unaided, what objections, if any, there are to an application. Idaho follows the same course, but compels the applicant to advertise when he has completed his works and is ready to make his final proofs.[1] This seems a good deal like locking the barn door after the horse is stolen. The time for the Government to be on its guard and to hear all the pros and cons on an application is, it seems to me, before the applicant has been allowed to construct works of a permanent character.

CLASS "C" WATER PRIVILEGES.

The method adopted for protecting the public interest in the larger water and water power privileges is a most important point in any Water Act. What special requirements if any are made of applicants proposing to engage in the sale, barter, and exchange of water or of water power? Such privileges are

[1]Civil Code, section 3257, 3260, being Laws 1903, 223, ss. 4, 7.

quite different from grants for the use of water upon applicants' own lands. In the latter case the benefits from the use of the water are derived indirectly through the products of the soil, and, in the very nature of the case, through our doctrine of appurtenancy the use must remain distributed among many individuals. In the case of the larger privileges, however, once granted, they often become the basis of monopolies. The public has a vital interest in them; too often their control passes into the hands of a favoured few, so that these few and their successors may make profits out of them altogether out of proportion to the cash capital invested, and the water-laws should be framed so as to guard against this.

Applicants seeking the right to develop such privileges in this province must in the first place do considerably more advertising than other applicants. They must not only advertise the fact that their application and petition are on file and that objections thereto may be entered by any interested party, but they must again advertise when the plans are filed, and both these advertisements must be made in the *British Columbia Gazette* as well as in one or more of local newspapers.

Moreover, since 1897, they have had to obtain both a water record or license and a certificate of the approval of the undertaking. The distinction between these two documents is an important one. The license is the water patent and is issued by the Comptroller. The certificate is the approval of the general scheme outlined in the application as the same may have been amended or modified at the instance of the Government, and is issued by the Ministry.

In dealing with the applications for the larger privileges, while the Comptroller still examines any proposed project from an engineering point of view and determines such matters as whether there is sufficient unappropriated water in the stream, whether the plans of the proposed works are such as to insure the safety and stability of the structures, whether there is proper provision to guard against waste of water, and so on, it is left to the Minister, after an investigation and report by the Board, to deal with the undertaking.

Too great emphasis can not be placed upon the investigation of every such proposed undertaking by the Board. In the course of its investigation it will be sure to bring to light any inherent irregularities or difficulties, and each case will go to the Minister in a pre-digested form.

The certificate of the Minister is given after the hearing of any objections which may have been lodged by interested persons and really amounts to a determination that the undertaking as approved is in the public interest.

Under the present Act, the hearing of the Board and the action of the Minister in regard to the undertaking come at an earlier stage in the procedure than under former Acts. The certificate must not only be obtained before the water license is issued but before authority is granted to make surveys. The idea which underlies this change is that once the applicant is permitted to make larger expenditures for surveys and detailed plants it would be rather awkward to refuse the approval of the undertaking. It is not necessary to have the detailed plant in order to determine such questions as whether the project is in the public interest or whether the financial ability of the company is such as to carry it to completion.

One of the stumbling blocks in the way of conserving the interest of the public in the waters of the province is the activity of promoters who file upon sites far in advance of the time when they can be utilized and afterward they or their successors claim a vested interest in them. These promoters are really middlemen who deal with the Government on the one hand and with capitalists on the other.

Why this mad rush all over the West in quest of power-sites to be filed upon? They talk about the mining fever of the '50's, but future historians will very likely be talking of the water-power fever of the 1900's. The water-laws should make it impossible that any man or group of men merely by the filing of a few documents and the payments of a nominal fee can hold a site until such time as there is some actual need for its development and they virtually say to the public "If you want to use this site, you will have to deal with us." Unfortunately, there are already cases on record in this province where large sums have been offered (I think in one case a quarter of a million dollars) for water privileges secured under prior filings but where little or no development has been made.

Once the public is thoroughly aware that it has an interest in such transactions, once it is clearly understood that this money, in the long run, does not come out of the capitalists who pay it, but out of the pockets of the people in the form of increased rates based on increased capitalization, just so soon will such transactions be discountenanced. The "Water Act of 1914" has some interesting clauses on the point. In the first place there is this investigation by the Board and report to the Minister, already alluded to, requiring the stamp of approval upon the undertaking before the applicant is allowed to proceed with expensive surveys.

The Act does not stop at this point, however. It requires that no license and no authorization to make surveys shall issue to any such company applicant "unless it is shown to the satisfaction of the Minister that the applicant is financially able to carry out the undertaking, and in any case that the authorized capital of the company exceeds fifty per cent of the estimated cost of the proposed works, and unless twenty-five per cent thereof is subscribed and ten per cent thereof is actually paid in cash."

"Is this not too drastic"? some one may ask. My opinion is that it is not. If the clause is to accomplish its purpose and discourage all but legitimate developments, its terms must be plain and to the point. When the time is ripe for the development of power at any particular stream site, capital may be depended upon to come forward with its bona fide application to develop such site. In the meantime, how much better that the province should hold all its unoccupied sites, taking care to accumulate careful data respecting them and giving the same due publicity:

However important the point just made, there is one of still greater importance in reference to the same general subject. It would not be in keeping with enlightened administration to closely watch the granting of these larger water privileges and then cease to have a care about them. The Government must be on its guard every moment. It must see that the particular licensees into whose hands a valuable privilege is placed does not do the very thing which is

objected to on the part of the promoter, that is, place a high valuation upon that which cost the licensees nothing and proceed to charge rates based on valuation.

As the population of the territory in the neighbourhood of a water-power site increases and as coal and other fuel supplies become more costly, the earning capacity of the water-power is greatly enhanced, while the cost of producing a horse-power is not altered. This increased earning capacity is due to the natural asset which belongs to the public, and the public should reap the benefit.

There are two simple methods by which the capitalization of grants can be prevented. One is to make the franchise or license indeterminate, as is done in the state of Wisconsin, Under this method the state can at any time buy back the investment of the company by paying a fair valuation for the tangible works and physical assets of the company plus a fair bonus.

The other method is the limiting of the franchise or license to a definite period of time, say 40 or 50 years, as is done in the province of Ontario and in several states. Under this method the water privileges automatically passes back into the possession of the province at the end of the stated period to become at that time the subject of a new deal between the province and the same or some other licensees. This is the method adopted under the Water Act 1914.[1]

If, at the end of that period, a renewal of the license and certificate is granted, it will be subject to such laws and regulations as are in force at that time. The administrative systems of the province will be in better shape to deal with such problems at the end of 50 years than now; therefore, the public interest of the future generations at least will be safeguarded by the lease systems.

[1]Sections 10 and 81.

APPURTENANCY AND TRANSFERS.

Irrigating wheat, using galvanized dam.

The idea of making the water license appurtenant to the land upon which the water is used has heretofore been given very strong expression in the British Columbia Act. This prevents trafficking in water titles with the consequent accumulation of extensive rights in the hands of a few; it also promotes beneficial use of the water because an applicant is tied down in any case to just what he can benefically use on the particular land in question.

In saying, however, that the water license shall in all cases, be made appurtenant to the land or mine upon which the water or power is used, the Act has in the past gone too far. There may be land which has become water logged, or land with a very inferior soil, Considering society at large, it would not be right that large quantities of water should continue to be used on such land when they could be applied to better advantage on other soil. Or, there may be a mill used for the concentration of mineral ores where it would be very undesirable to hold that minerals from certain claims only could be crushed there. Those claims might be worked out, but the Government would not care to confiscate the valuable development which has been made at the mill site.

The 1914 Act leaves it open to the Comptroller to canvass every situation thoroughly before issuing any license and if he deems it undesirable that the license should be made appurtenant to the undertaking or project of the licensee, defining that undertaking just as the land might be defined by metes and bounds.

Irrigation licenses will, in every case, be made appurtenant to the land itself; but to avoid the evil consequences following the attachment of valuable water rights to inferior lands, the Act provides a means by which such licenses may be transferred. The consent of the owner of the license sought to be transferred must be obtained; the standard of the use proposed must be as high as or higher than that under the existing license; the same publicity must be given by way of advertising and publishing notices as in the case of a new application and the rights of existing licensees must not be prejudiced by the transfer. Here

again, the British Columbia Act is stricter in its requirements than other Acts, which place this whole matter of transfer, in the discretion of their state engineers.[1]

Provision is also made for the transfer of licenses for the sale, barter, or exchange of water or water power.[2]

The above methods of transferring licenses may seem a little inconvenient at first glance, but, in opening the way for transfers, caution must be exercised not to give a loophole for defeating the main purpose of this Act.

DUTY OF WATER, AND IRRIGATION RIGHTS.

One of the perplexing questions for every Government to answer is as to how the quantity of water which is to be allotted for irrigation purposes to any particular lands is to be determined. The farmers will all tell one story that the soil even of the same neighbourhood differs greatly; there is the porous gravel, the mpervious clay, and the medium loam.

British Columbia, wisely, I think, has refrained from giving expression in her Water Acts to any stated duty of water for her lands, whether as a maximum or otherwise. Some of the states have followed a different policy in this respect, Wyoming having established a flow of one cubic foot per second of water for seventy acres of land as a maximun duty.[3] While in Idaho the maximum is one cubic foot per second for fifty acres.[4] The Idaho statutes go farther and specifically make every water binding upon the state as to the right of licensee to use the amount of water as therein mentioned.[5] The information that experts have accumulated on the subject of "Duty of Water" suffices to show that the quantity to be allotted varies greatly according to the location and character of the soil; only an investigation extending over years can satisfactorily decide the proper duty; therefore the only safe course to follow in the meantime is to make every license subject to subsequent re-adjustment at a future time and to limit it to such quantity as may be determined in the future to be suitable for the lands in question. This is done in the British Columbia Act.[6] There is also a clause limiting the quantity which may be diverted by any licensee to the requirement of the particular crop which is grown on the land from time to time.[7] In keeping with these provisions, every license for irrigation purposes shows on its face that the quantity therein mentioned is subject to alteration in the future.

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[1]Statute Wyoming 1910, 725-6. Oregon Laws 1909, c. 216. s. 4 (being s. 6629 or Title XLIII. of Lord's Oregon Laws). Idaho Civil Code ss. 3255, 3264, being Laws 1907. 314 s. 1 and 1903, 223 s. 11 as amended 1905, 27 s.1. and 1907, 507 s. 1.

[2]Section 14

[3]Wyoming, Compiled Statutes of 1910, section 777.

[4]Idaho, Civil Code, section 3253, being Laws 1903, 223, s. 1¼ as amended by Laws 1903, 357 s. 1.

[5]Idaho Civil Code section 3262.

[6]Section 20, 29, and 125.

[7]Section 127.

The Act places power to compel rotation in the use of water by licensees for irrigation purposes in the hands of the engineer of the water district,[8] and if licensees can not agree as to the proper distribution of the waters of any stream, the Minister of Lands may, on the recommendation of the Comptroller, appoint one or more water bailiffs on any stream.

These water bailiffs have the necessary powers to lock headgates, make arrests, and supervise the distribution of water under the direction and guidance of the engineer and the Comptroller. The Minister determines their compensation, which is paid by the licensees in the locality affected in proportion to the respective quantities of water used by such licensees, or to the respective quantities of water which they are entitled to use as the engineer may determine. To facilitate the collection of the amounts due, they are made a charge upon the lands to which the licenses are appurtenant.

The new Act provides that every person diverting water from any stream shall construct and maintain a substantial headgate and such weirs or other measuring devices as may be required. Several of the states have enactments on this subject, but British Columbia goes farther than any of them inasmuch as the Act authorizes the Comptroller, if the licensee fails to construct his headgate after being so directed, to cause the same to be constructed and all costs and charges connected therewith are to be paid by the licensee and if not so paid become a charge upon his land. This certainly ought to insure the construction of headgates whenever the department is ready to order such construction.

RIPARIAN RIGHTS.

One of the most interesting questions that has centred around the Water Act in recent years is as to just what extent, if any, those persons who own land adjoining the banks of a stream technically known as "riparian proprietors" have a right to use the water of the stream without a record. In 1892, the legislature of British Columbia enacted a section dealing with this question, respecting the meaning of which there has been and still is a wide difference of opinion.[9]

The people of British Columbia have exercised a great deal of patience in waiting for either an interpretation of the doubtful clause by the courts or a definite word on the subject from the legislature. A case which was pending at the time the present Water Act was adopted went up to the Privy Council last June and the judgment in that case has at last thrown a degree of light on the subject. It gives us this much information:—an owner of land adjoining the stream banks who acquired his title from the Crown since 1892 and who has made no use of the stream water can not, on the mere claim of his riparian ownership, enjoin a record holder from diverting the water under his record. The right of the record holder, under such circumstances, takes precedence and he may divert even to the full extent of the stream flow. In other words, the right

[8]Section 126.
[1]Section 34. C. f. Revised Statutes Colorado, 1908, s. 3236-7 and 3246.
[2]This section was almost identical in wording with a similar section in the Irrigation Act of the province of Victoria, Australia, passed in 1886 (50 Victoria No. 898 s. 4), and has been preserved with practically no change in all the Acts of the province since 1892, being section 4 of the 1914 Act.

of such riparian owner to have the water of the stream flow by his land undiminished in quantity has clearly been taken away by the statutes of British Columbia.

Even with this one phase of the law definitely interpreted, there is still a large realm of doubt left. What shall be said of a riparian owner whose title to his land antedates 1892? What shall be said of a riparian owner who has made beneficial use as opposed to a subsequent record holder? Again, what shall be said of the interim right of any riaprian owner in the province to an interim use of stream waters until such time as such waters are totally appropriated under records and licenses? Again, what shall be said of raiprian owners in the Railway Belt, who acquired their titles from the Dominion Government during the period when the Water Acts of the province were not so effective in that Belt? Must the people of the province wait for judicial decisions on all these points before they may know what the law is? This may be many years. Is it not preferable to draw a distinct line of demarcation and say without prejudice to rights that have accrued in the meantime, "From now on, the law is so and so?"

That is exactly what has been done in the new Act, and with the acceptance of this Act by the Dominion Government, which is confidently looked forward to in the near future, the perplexing situation as to just where riparian rights begin and end in this province will be in a fair way to be cleared up. The clauses referred to read as follows:—

"6. (1) Every riparian proprietor claiming any right to divert water or to the exclusive use of water for any purpose by virtue only of his being such riparian proprietor shall, on or before the first day of June, 1916, file with the Board a statement of claim setting forth such of the particulars contained in section 294 as may be applicable to the right claimed.

"(2) After the first day of June, 1916, no right to divert water or to the exclusive use of water for any purpose shall exist by virtue only of any riparian ownership of land, and no claim therefore shall be entertained, saving only the general right of the public to the temporary use for domestic purposes of water to which there is lawful access, subject, however, to the rights of any licensee."

Claims filed by riparian owners under this section will be dealt with by the Board in the same manner as claims based upon records. This legislation, when adopted by the Dominion Government, will have the effect of having every right to divert water from any stream in the province whether within or without the Railway Belt made the subject of a license and this in turn will be conducive to good administration.

Since 1911 no one can acquire a storage license in British Columbia unless he already holds a diversion license authorizing him to use water in a particular manner, and the quantity mentioned in the storage license will be limited to the quantity which can be used beneficially under the diversion license. This is a strong feature in the Act and makes it consistent throughout. The storage sites are limited in capacity just as the natural flow of the stream is limited. Every effort is being made to see that the natural flow of a stream is beneficially utilized. Likewise every effort should be made to see that the storage sites should be preserved for those who have use for them. Under this plan the land owners

themselves will own the storage rights just as they now own the diversion rights.

If it is against policy to have carrying companies operating between the farmer and his source of water supply, likewise it is against policy to have a storage company so operating. True, the individual has not the resources at his command for building large storage dams, but under the Act numerous forms of co-operation ownership and control are provided. When the time is ripe for the development of any particular reservoir site, I feel that a way will be found for developing it under the present policy of the Act, and that the result will be for the lasting benefit of water right holders. If the opposite principle were accepted and any person who desired to build a dam could acquire a storage right, the results would be unfavourable to good administration.[1]

STRINGENT REQUIREMENTS.

The Water Act has been criticized here and there because of its stringent requirements. In bringing any new systems of administration into operation, however, and especially in changing from easy-going methods to stricter ones, a little inconvenience must be felt by the public. Think of the confusion in water titles and the expensive investigations by the Government which might have been saved if the framers of the early Acts could have exercised a little more foresight in drafting their water clauses.[1] Owing to the systems in vogue years ago, the Board of Investigation is to-day at great labour and expense doing the work which the Commissioners who made the records could have done with comparatively little inconvenience at the time. In the light of this experience, the aim of the present Act should be to tie every applicant down in absolutely definite terms. This will lead to better understanding in the end and will avoid expensive litigation. (Applause.)

CHAIRMAN: If there is no discussion on this paper, I will ask the Local Secretary to make some announcements.

Mr. DYNES: Mr. President, ladies and gentlemen,—I am requested by Mr. McCoy, the President of the Aquatic Club, to specially announce that all the events this afternoon are open to everyone. I may say that this regatta was specially put on for the entertainment of the visitors. (Applause.) It is customary to have the regatta on Thursday afternoon because the other towns along the lake have a Thursday afternoon half holiday, thus ensuring a larger attendance.

An arrangement has also been made with Mr. Philip H. Eraut, in charge of our local irrigation committee, to give a short talk to-morrow afternoon on

[1]There is a case on record in Oregon where some promoters, having no lands of their own, got on the track of a large project which involved the use of a certain storage reservoir: these men rushed into the state engineer's office with prior filings on the reservoir. It was simply a hold-up game, and the purpose of the whole project would have been defeated if the promoters had secured the storage right. The Board of Control refused to deal with them and the Supreme Court of the state upheld the Board on the ground that it was against the public welfare to grant a right of that nature to persons who had not the lands upon which to use the water (Cookingham et al v. Lewis et al 114 Pac. 88).

[1]Among other things those Acts did not call for a description of the lands where the water was to be used, and one record might mention half a dozen different uses for the water.

municipal irrigation. Soon after his talk will be the motor trip when you will see the irrigation system about which he will tell you.

CHAIRMAN: We are now going to have another talk from Mr. Smith.

Mr. C. L. SMITH: You who were here yesterday will remember that I made the statement that the measure of civilization of any people was the character of its homes and the manner of living in those homes; that they were more important than bank clearings and commercial transactions. I would have liked this morning, if I could have started at eleven o'clock, to have given you somewhat fully a talk on home-making that in some form or another I have given two or three hundred times a year for the past thirty years, and I have seen results accruing to the benefit of those who listened to it, from that talk in a larger measure than from any other subject I have ever talked on. If I might select a text for my talk, because some people call it a sermon and would like to have it delivered in their churches, it would be a little couplet from Burns, who says "To make a happy fireside clime for weans and wife is the true pathos and sublime aim of human life." (Applause.) And I would like to leave the thought that when life's work is done for one and all of us, we will be remembered by the good we have done rather than by the dollars we have accumulated. (Applause.)

I was just thinking when Brother Elliott was talking what might possibly have been my field work if I could have had the opportunity sixty years ago to go to such a school as he described to you here. Nothing of that kind had ever been heard of then. My parents settled in the woods of Southern Michigan and my earliest recollection of life there on that farm was living in a little log cabin. I never even had a common school education. Four months during the winters of 1855-6 and 7, I had the opportunity each winter to sit on a wooden bench and study how to spell some common words and to copy sums in Adams' arithmetic, five of us using the same book, and the teacher, a Baptist minister, used to write out some letters on sheets of foolscap, which I would try to imitate. That finished my education at school. As I told you yesterday, from those associations I imbibed certain ideas and one of them was that the best man in the community was the man who had the pleasantest home and home surroundings. I have never forgotten the impression I received from a picture in a little Sunday school book, of a haggard old man sitting on the floor in a bare room, a candle in front of him, and between his legs, some bags with the dollar mark on them and he was gloating over those, and underneath it said "The Miser." That is all I remember of it. I don't know what the reading text was in connection with it but I grew up with the fixed idea that the man living for money could make the meanest man on the face of God's green earth; therefore, I never had any particular sympathy with any individual engaged in any enterprise simply for the money he could get out of it rather than for the good he could do. Of course, when I work, I like to have somebody pay me for it, because if there is anything I like better than talking about the things I believe, it is spending the money I get for doing it (laughter) and I generally manage to spend all I can get and enjoy the spending of it. I enjoy this work so well that I keep at it all the time and while some members in my audience sometimes get mad at my plain

speech, they nearly always want me to come back. I remember once that a man and his wife had been quarreling because he persisted in allowing the hogs to run in the door yard. I knew nothing of the incident, but it so happened in my talk that morning, I said that there was a place for a hog on every farm but it was not in the front door yard. (Laughter.) That man got up mad and went out of the hall and the next morning he gave me quite a little tongue lashing for insulting him before all his neighbours (laughter) but next year, when I came back, I heard that he had the front door yard fenced. (Laughter.)

During my early experience among the farms, an impression I received was this: whenever I found a man who was making good, he patted himself and said "I did it" (laughter) and whenever I found a failure, the poor, deluded fellow always laid the blame on somebody else. (Laughter.) A little later I want to refer to two contrasting pictures of this kind that I use in my home making lecture which, by the way, is only fourteen hours long. (Laughter.)

I have lectured in Farmer's Institutes and for various organizations for more than thirty years. My hobby has been diversified farming, and improvement of living conditions on the farm. At the present time I am employed by the Oregon-Washington Railroad and Navigation Co., to devote my whole time, and energy to the improvement of the condition of the farmers living in the country reached by our lines. I am frequently asked the question, "Why are the railroads interested in improving the condition of the farmers?"

The traffic managers of our large transportation companies have long recognized the fact that any section of the country devoted to a single crop system of farming is an unreliable and unsatisfactory source of revenue. Their statistics demonstrate the fact that the largest volume of business not only comes from a district where a diversified system of farming is carried on, but such business is more equally divided throughout the year and can therefore be carried on more economically and satisfactorily. It is also a recognized fact that only a small percentage of the productive capacity of any given section has as yet been fully developed. Any increase of business must necessarily come from the development of these latent resources. There are three directions in which we may look for future development: First, the clearing and bringing under cultivation of logged-off lands. Second, the increase of irrigated areas by the use of storage reservoirs and pumping plants. Third, and most important, the breaking up of large holdings already under cultivation into smaller farms. This necessarily means more people on the lands, more profitable and continuous employment of labour, more intensive methods of cultivation, more and better livestock, more business for the merchant, the banker, the manufacturer and the transportation companies.

It was probably for some reason like the above that Mr. R. B. Miller, Traffic Manager of the O.-W. R. & N. Co., employed me to study the situation and suggest methods for improving the conditions in the country served by the O.-W. R. & N. Co. At the first conference that I had with Mr. Miller and Mr. Farrel regarding my work, we reached the conclusion that the promoting of orcharding had been pretty well exploited, in some instances possibly overdone. Therefore I was given permission to exploit my hobby of diversified farming, and I am happy to say that the results secured are not raising any less fruit or

wheat, but they are milking more cows, feeding more pigs, producing more meat and spending more money.

One of the strongest reasons I have had for advocating diversified farming with dairying as a factor is the fact that experience and observation have led me to the conclusion that this system of farming results in better homes and better home conditions than a single crop system of farming.

Perhaps the best way for me to interest you in the subject would be to give you some of the reasons why this is one of my pet topics, a sort of hobby that I always ride whenever the opportunity offers.

As a farmer's boy in a new country I became familiar with all those conditions that attend pioneer life—the struggle for bare necessities, the hard work, all the coarse, rough and rude surroundings as well as hopes and ambitions for better things, when more land will be brought under cultivation, when herds and flocks will be increased, orchard in bearing: and the glad day when the new house will be built. I have thought sometimes that it was fortunate for me that the community was largely made up of thrifty New Englanders who brought with them to the new country a knowledge of, and taste for better things, the cosy farmhouses with neat dooryards, spreading shade trees, the old fashioned flower garden with its lilacs and roses, its hollyhocks and marigolds, and I have never forgotten the first spring on our own farm when the johnny-jump-ups, grown from seed sent from Connecticut in a letter, first blossomed. They were very small in comparison with the pansies that we have today, but they had the same rich colouring of gold and purple. Our first rose bush, was grown from a slip contributed from one of the neighbour's gardens. Lilacs and honeysuckles were procured in the same way. A little was added each year until in a few years the door-yards in the neighbourhood were bright with flowers of every colour from early spring until late in the autumn. And then there was the vegetable garden where mother and the children seemed to have the greatest interest and did most of the work. Horse radish that moved me to tears when I had to grate it, and the pies that mother used to make from the first stalks of pieplant, and the early greens from mustard to dandelions to be followed by the early beets and spinach, then asparagus, "sparrow grass" we used to call it. Then came the early peas, string beans, crook-necked squashes and the first mess of green peas and new potatoes was always an event that was looked forward to with bright anticipations. Strawberries, raspberries, currants and gooseberries and after a few years the harvest apples, cherries, pears, plums and late apples that we used to store away for winter use. I have seen all of these in abundance while the farmers yet lived in the settler's log cabin, only a few acres had been brought under cultivation, and very little, if anything, had been produced to sell.

Three years before the outbreak of the Civil War a change of location brought me into contact with a different class of people in an older settled country, large farms, larger houses and somewhat different conditions of living. This was among the Hoosiers of southern Indiana. They were accustomed to living largely within themselves. The major portion of the farmer's clothing was carded, spun and woven by the mothers and daughters. What they had to eat was grown on the farm. About the only things they sometimes bought from

the country store were tea, coffee, sugar and sometimes a little rice. They had hominy and cornmeal mush but had never heard of breakfast foods. Eggs, poultry, beef and pork, they had in abundance. The bacon was made at home. They were hospitable entertainers, and wherever I visited, although I carried with me a healthy boy's appetite, I always got enough to eat.

This pretty nearly covers my experience and observations of farm life up to the outbreak of the Civil War. You will readily see from this experience how naturally I formed the idea that for one to live on a farm meant an abundance of good things to eat, grown by the farmer and his family. Right here I wish to explain that up to this time in all my experience I had never heard anything that even suggested the idea that anybody anywhere, ever secured land for the purpose of making money. My only conception of farming was "Home Making." After the war when I settled in Minnesota, I became familiar with other phases of farm life, some of them almost ideal, some others less satisfactory in character. I can best illustrate this perhaps by relating a little experience through which I became familiar with the contrasting conditions of farm life and interested in the problem, "Why such difference?" That portion of the state in which I lived was a fertile rolling prairie where one could go miles and miles without seeing a tree or shrub. The country was new, very few of the settlers having been on their homesteads more than three to five years, and as usual with pioneers their means were very limited. Physicially unable to perform severe manual labour, the first employment that I undertook was canvassing for the sale of nursery stock. This necessarily brought me into direct contact with the farmers and their families at their homes. And I found in these homes such radical contrasts to those with which I was familiar that they naturally attracted my attention and excited my interest.

Driving along the road across the prairie one June day in 1866, about 11.30 a.m. I began to get hungry; coming to a settler's cabin that stood in a corner of a wheat field, I saw a man down on his knees beside a mowing machine which he was evidently repairing, getting ready for the annual hay making. There was a small stable about one hundred feet from the house, and in the space between the house and the stable, was a McCormick reaper, a broadcast seeder, two plows, a hay rake, an old harrow, an old wagon and a pair of bob-sleds, evidently where they were unhitched from the last time they were used. I asked the man if I could get some dinner; he got up, looked me over and said yes, he guessed so if I could put up with what they had to eat. "You can probably stand it," he said, "for one meal, we have to all the time," and then went on with his work. Not a very cordial or hospitable greeting, but I was hungry, so I unhitched my horse, gave him some oats which I carried in a sack, under the seat, and then sat down on the tongue of the mower to talk to the man while he worked. About the first intelligible words that the man said were that the man he bought the mower of cheated him, and then he went on to explain that all of the agents or canvassers were rascals and liars, and that the farmers were their special prey. While he was dilating on this topic, a sour-faced middle-aged woman with a shrill voice came to the door of the cabin and said, "Dinner's ready." He dropped his wrench, wiped his hand on his ragged overalls, and told me to come on. We went into the house, he said to his wife, "This man wants some dinner." She

said, "All right, only it ain't much of a dinner." We sat down to the table, I wanted to wash but I did not see any opportunity and as the man had seated himself at the table without washing his greasy, dirty hands, I concluded to make the best of it and sat down on a stool at the place indicated. The man said, "We haven't got any potatoes, we raised quite a few but they all froze up during the winter and we haven't had any since; about a month yet before we get new potatoes; this country is so cold it isn't fit for a white man to live in anyhow; the Lord made it for Injuns and buffaloes and I think it would be a good thing if he would give it back to them." Then he passed me the bread which was neither well made nor well baked, the baking not the fault of the woman, perhaps, as the cooking stove was old and cracked, and as nearly as I could judge from observation, the supply of wood was small in quantity and inferior in quality. They had fried salt pork, which the man informed me he had bought in Lake City at fourteen cents a pound. I asked him how long he had been on the farm, he said, "Five years." I asked him if he did not raise any hogs. He said, "No," he had too much sense to try to raise hogs where a man could not raise corn. I I asked him if he had tried to raise corn, and he said a man was a fool to try to raise corn where they had frost nearly every month of the year. I asked him if he kept chickens and he said that the winters were too long and too cold, the hens would never lay in the winter and in the summer eggs were never worth anything and it would cost more to feed a hen that she was worth. I asked him if he had any garden; he said he hadn't time to bother with little things like that. I asked him if he kept cows; he said it was too much bother, he hadn't any pasture and nobody to herd the cows; and it did not pay any how to keep cows where there were such long winters. They had some strong black coffee; he apologized for not having any sugar or butter, as they had not been to town for two weeks.

Here you see the only things they had to eat were bread and meat, bought from the town 18 miles away and as I learned afterwards, bought on credit to be paid for after harvest. The man assured me that because he had to buy on credit he was always cheated on the price, the bill was always larger at the end of the season than it should be. They had tried different merchants but every one of them was dishonest and cheated him whenever they had the chance. I did not see the children as they were away to school; but while I was hitching up my horse after dinner, feeling sort of uncomfortable from the effects of the conversation, I looked over the house and its surroundings and I thought, what a life for a man, woman or child to live in such a place year after year. I had asked the man to buy trees, plants or seeds to start a grove of timber, start some fruit in the garden, urged him to make a garden pointed out what a nice yard he could have, with a few trees, a fenced grass plot, and a few flowers, but he assured me that he was not able to have any of these things, anyhow, he was just "staying" until he could make enough money to move into town, where he could have better opportunities to educate his children; he was "going to sell out the first chance he got anyhow." I tried to argue with him that a small amount of money and labour spent in improvments would greatly increase the selling price of his farm, but he turned a deaf ear to all my suggestions, and I rode away with a feeling that if that was farm life, on the prairies of Minnesota, I did

not want any of it. And as I rode along in the bright June weather, the green prairie dotted here and there with bright flowers, I wondered whether it were true what this man said: that their coarse and rude surroundings, untidy, unthrifty condition, lack of necessities and comforts of life were, as he had maintained, due to the climate or to any economic condition mentioned. And the more I pondered the matter, the more fully I came to believe that the fault lay, or perhaps more properly speaking, the cause of the unsatisfactory conditions was in the man himself rather than in the soil, the climate or business conditions.

In pleasing contrast to this, only a few miles away, and at about the same hour of the day, a few days later, I came to a small field of corn at the left of the road. The corn was from 2 to 2½ feet high. The rows were straight and there was was a very good stand of thrifty, rank growing stocks. A man with one horse and cultivator was coming down the row towards the road so I stopped and waited until he came out to the end of the row and I asked him the question, "Can I get some dinner here?" And he answered cheerily, "Oh yes, we always have plenty to eat." And when he asked my business, and after a few pleasant remarks, looked at the sun and said that it was not quite noon and he wanted to make another round before dinner. He said, "You drive up to the house, put your horse in the barn, tell my wife I said you could have dinner and it will be all right."

I saw a boy with a dog over on the prairie a short distance from the house herding some cows, and as I came up to the house I saw that something like a quarter of an acre of ground in front of the house had been enclosed with a plain board fence, several young shade trees had been planted, the ground raked smooth and thickly seeded to blue grass and white clover, some lilacs, some syringas, a few rose bushes and a little bed of annual flowers, some of them just coming into blossom made the front of the house look neat and homelike. Back several rods from the house to the north and west was a considerable area, four or five acres, of newly planted willows and cottonwoods; within this area something like an acre had been fenced with lath for pickets for the vegetable garden. At the side of the barn or stable, because it was a very small building with no loft, was a shed under which was neatly packed away all of the farm tools and machinery. There was a gate on the side of the yard towards the barn and from this a neat board walk led to the side door of the house. There was no rubbish about, everything looked neat and tidy, and among other things I noted was a wood shed, because that was an unfamiliar sight in that neighbourhood. After taking care of the horse, I went up to the house, rapped at the door; a cheery faced woman answered my rap, asked me to come in. I told her my business; she said all right, dinner wasn't ready yet, but for me to come in and sit down. She asked me if I wanted to wash, showed me a clean wash basin with a clean bowl and a clean towel, soap and plenty of fresh water, apologized, however, that their house was small, and they had but few conveniences, but I noted that everything was neat and clean. She showed me into a little "front room," the furnishings of which were cheap but neat and in good taste; a small centre table held a few magazines, newspapers and books; I heard some children laughing out of doors and their mother called them to come and get ready for dinner; in the meantime the farmer came in to dinner and while

waiting engaged in conversation. I found him very cheery and good natured. He spoke about the pleasant weather, how nicely things were growing, thought that they had just about the right amount of rain to produce good crops, and was optimistic enough to have faith that prices were going to be satisfactory. Informed me that he had been five years on the place, that he had begun with practically nothing but had added a little each year in the way of improvements. They were in hopes in a few years to be able to build a good house, that he had a nice crop started, but that he had only about half of his 160 acres under cultivation as that was about all he could handle without getting into debt and he did not like to do that.

The wife called us in to dinner; and I was ready, for several times there had been wafted to my senses an odour of chicken cooking, and I realized that I was to be treated to something better than bread and pork. The same room was used for both kitchen and dining room, only a pine board table, but there was a clean white cloth on it. Things were neatly arranged and I noted at a glance the fact that the bread was well made and well baked and thought that perhaps the woodshed had something to do with it. There was a dish of white, creamy mashed potatoes on the table, and the farmer helped me to a liberal supply of this as well as stewed chicken. Always having been of an investigating turn of mind, I said, "Where do you get such nice potatoes at this season of the year?" He said, "I always sort out a few bushels of my best potatoes in the fall of the year, at digging time, and put them carefully by themselves, covering them with a layer of straw and a few inches of dirt, then another layer of straw and more dirt so as to be sure no frost can get at them. After the ground has frozen and snow comes, I haul a couple of loads of manure and spread over the heap; this keeps the frost in the ground until late in the season and we never open the pit until sometime in May. By handling them in this way we keep potatoes sound and good until the middle of July."

My next surprise came when the good wife passed me a saucer full of asparagus stewed in cream, and I said, "Do you raise this?" He answered, "Oh yes, we couldn't get along without asparagus. I bought an ounce of seed for ten cents the year we came here and raised plants enough to plant three rows across the end of the garden. We have all we want to use through the latter part of May and all of June. By that time we have peas and other vegetables and we let the asparagus grow and store up strength for the next crop. We seldom cut any after the green peas come; we not only have all we want for our own use but nearly every time we go to town during the month of June we take two or three dollars' worth to sell and frequently sell some to the neighbours. I tried giving it away at first as an inducement to them to plant and grow for their own use, but most of them are either too indifferent or lazy to do it and I concluded that if they wanted it they might pay for it. Several of them paid us more for asparagus during the year than it would have cost them to plant, cut and care for such a plot as I have."

As the butter was passed I said, "I see you keep cows." He said, "Oh, we couldn't get along without cows, they are nearly half our living." And having in mind what I had heard at the other place, I said, "Does it pay to keep cows?" "Oh," he said, "as to that I don't know how you would figure it,

we wouldn't get along without them; we grow all of the feed, and whatever work it is to take care of them is generally done when we would be doing nothing else; then there is the increase in the young stock. What we use is certainly worth more to us than the trouble of taking care of them and we have quite a bit of butter to sell, so we figure that pretty near all profit. Oh, yes, I guess it pays to keep cows; anyhow, pay or no pay we wouldn't do without them."

Then I said, "I see you keep chickens, does that pay?" "Oh, yes," he said, "chickens don't cost anything hardly, and we have all the eggs we want to use all the time, chicken to eat whenever we want it, and we sell a great many eggs during the year." And then his wife broke in with, "And I sold enough dressed poultry last fall to buy the shoes, stockings and winter clothing for the children and myself." So the conversation ran on until I was pretty well filled up with stewed chicken, mashed potatoes, asparagus and nice bread and butter when the good wife got up from the table, went to the side of the room and from a shelf brought out some nice strawberry shortcake. This was a surprise, indeed, the first I had seen in the state, but I was much like the Irishman who undertook to eat through the bill of fare at the hotel. After filling up on two kinds of soup and fish, they brought on the roasts, Pat looked at the array and said, "Oh, my, here's the opportunity of me lifetime, and me so full of soup I can hardly breathe." But the strawberry shortcake was tempting, and I made room for it.

I said, "You grow strawberries, too?" "Oh, yes," he said, "we have had the strawberries ever since the first year. I had only one hundred plants to begin with. They cost me $1.25 sent by mail from Ohio, but nearly every one of them lived and from the new plants that I got that year I put out one-tenth of an acre. We have all we can use and sell some to the neighbours. We have been selling strawberries now for about three years but I don't believe there is a neighbour within three miles of here who has planted any, though I have offered to give them plants, if they would come and get them."

I thought to myself it was a poor chance to sell strawberry plants if the people were so indifferent to the matter. And questioning him further as to the expense, I learned that he could grow a bushel of strawberries about as cheaply as he could grow a bushel of potatoes. He said that he had quite a start with currants, gooseberries, and crabapples, and some wild plum trees that he had dug up near the river and planted out; they had been bearing now for about two years, furnishing them what they they wanted for their own use. The last year they had sold several dollars' worth. This year would have still more to sell as the trees were just loaded with fruit.

You may well understand that I rode away from this place with an entirely different feeling and a much higher idea of farm life on the prairie than I had the day before.

During my entire stay, which was something over two hours, I really enjoyed myself. I never heard a word of complaint from the farmer or his wife about the soil, the climate or the condition of the country. They didn't tell me anything about being cheated or robbed; they did not groan about the condition of the farmer and they did not say anything about selling out. They seemed to be prosperous and contented. They had a good farm, their herd of cattle

was increasing, they had no debts, they were provided with all the necessities and many of the luxuries of life; not only that, but they were full of hope for the future, contented and happy. And as I rode away and looked out over the broad prairie dotted here and there with bare, comfortless cabins, without a tree, shrub or vine to break the force of winter's wind or shelter from the hot sun of midsummer, I asked myself the question, "Why is it that men slave early and late, depriving themselves of these beauties and luxuries so easily within their reach, in a blind struggle to produce something that they can exchange in the market for money, never stopping to count what luxuries and comforts that money will buy that can compensate them for the hardships and deprivation endured to procure?" Of course I had never heard of a farmer's institute then, nor ever dreamed that I should stand in public and talk on the subject of home making. But unknowingly I was learning a lesson that has not only been of value to me, but that I have tried to make of value to others. Through experience and observations of like character for twenty years, the conviction grew upon me that any man who owned a bit of land might have a home with trees and flowers and grass and sunshine; might have a garden where he could grow an abundant supply of fresh fruit and vegetables, might have new laid eggs, fresh butter, milk and cream; in fact, might have of his very own the better things that earth produce if he only willed to do it. Therefore you will see how naturally and logically, when in after years I attended my first farmers' institute and had a chance to "talk," my first demonstration was the advantage of diversified farming and before I had finished I was pleading for a place in that system for the cow, the pig and the hen and not stopping at that, urged the planting of trees, the fencing of the dooryard, to be used as a playground for the children and a place for the flowers, and not a chicken yard and hog pasture.

There has never been a time before, in the history of the country, when so many people in all the various callings of life were honestly interesting themselves in the welfare of the farmer, the improvement of farm life and the methods of farming, as there are at this time.

That the interests of all the people are mutual, and that there should be mutual co-operation for mutual benefit is a growing sentiment that is already bearing fruit, in better feeling between town and country, between transportation companies and the people they serve. Abuses are being corrected and misunderstandings explained.

I will give one illustration that shows the drift of sentiment. In the readjustment of business following the Civil War, the farmers seemed to be getting the worst of the deal, and in their first attempts to correct some of the evils they were too radical and failed to give due regard to the rights of others. This brought on a sharp conflict, especially with public corporations. Many farmers came to regard all corporations as unnecessary evils that ought to be abolished. In the struggle for some equitable adjustment I was associated with the farmers and formed some close friendships with those who were trying to improve conditions. Among these was one who always regarded a corporation much as he did a rattlesnake. Although we often differed, it did not impair our personal relations. Many years ago he sold his Minnesota farm and moved to Oregon.

In the summer of 1901 I was asked by the traffic department of the Southern Pacific Railway Company to deliver a series of lectures on "Diversified Farming." "Dairying" and "Home Making" in the Willamette Valley. These lectures were well attended, aroused much interest and stimulated the dairy industry to a marked degree. One morning as I was waiting at the depot for a train, I saw approaching, a grey whiskered, elderly man, who, when he was within twenty feet of me, threw up his hands and exclaimed, "Great God, I guess its true." I recognized the voice of my old friend and greeted him, cordially. He shook his head and exclaimed, "I wouldn't have believed it. We read the reports in the papers and Mary said it sounded like our C. L. Smith; but I said, 'No, Smith would never work for a corporation,' so I drove up here eight miles to make sure. How could you ever backslide so far as to go to work for a corporation. I can't understand it."

"Why, it is all right. I am doing just the same kind of work I always did, and in the same way. The only difference is you and the other boys used to have to go into your pockets for money to pay my expenses. Now the corporation finds it pays them to put up for salary and expenses too, which enables me to do more and better work."

"I can't understand it, I wouldn't have believed it, there must be a nigger in the fence somewhere," he kept repeating.

Then I told him to come to Salem on Saturday and he would be better able to judge whether it was right or not. He was still sceptical and shaking his head as I boarded the train.

At the Salem meeting he and his wife were on the front seat, and for more than an hour I talked better farming, better living, better homes and home conditions, then closed with a few of the old familiar poetic quotations that had stirred the hearts of our farmers friends back there in Minnesota:

"Give knaves their gold
And fools their power;
Let fortune's bubbles rise and fall.
Who plants a tree or trains a flower
Is more than all.
And God and man shall own the worth
Of him who dying leaves as his bequest
An added beauty to the earth.

"One our faith and one our longing
To make the world within our reach
Somewhat the better for our living
And the gladder for our human speech.

"Let us scatter the germs of the beautiful;
By the wayside let them fall,
That the rose may bloom by the cottage gate
And the vine on the garden wall.
Cover the rough and the rude of earth
With a vale of leaves and flowers
And count by opening bud and cup
The passing of the hours."

If along these lines our lives are ordered then we can say as did the grand old Quaker poet on his last visit to his boyhood home at Haverhill:

"Adrift on time's returnless tide
As waves that follow waves, we glide.
God grant, we leave upon the shore
Some waif of good it lacked before;
Some seed or flower or plant of worth;
Some added beauty to the earth;
Some larger hope; some thought to make
The old world happier for our sake,
That only grateful hearts shall fill
The homes we leave."

Then my old friend with tears in his eyes sprang forward, clasped his arms around me and said, "God bless you Smith, go to it. If you can get the corporation to pay you for work like that, it is all right." (Loud applause.)

Irrigating with canvas, galvanized and earth dams.

Mr. E. FOLEY-BENNETT: Mr. President, ladies and gentlemen.—The Committee on Credentials beg to report that they have carefully examined all credentials to date and find that there are 169 duly accredited delegates, and five delegates whose credentials are not quite complete, making 174 in attendance. (Applause). Mr. President, ladies and gentlemen, I am very pleased indeed that it is my privilege to state this. In view of the fact that only a short time ago the cancelation of this Convention was seriously considered, it speaks for itself. If I were wishing to boost my local place, I might say that this attendance was caused by the attractions of Penticton, but I am not going to say that because it is not

true. The credit for this most successful gathering, in my opinion, is due to the splendid methods pursued by our permenant secretary, Mr. Rankin. (Applause.) A short time ago, when questioned on this matter, he promised he would make this the record convention in the history of our association, and as representing the Board of Trade, Mr .Rankin, I wish to tender to you the Board's sincere thanks for bringing this record convention to Penticton. (Applause.)

LIST OF DELEGATES AT THE PENTICTON CONVENTION.

Thos. Abriel, Arrow Lakes Farmers' Institute, Nakusp, B.C.
A. P. Augusten, Water Rights Branch, B.C. Govt., Penticton, B.C.
Frank Adams, U.S. Dept. of Agriculture, Berkeley, California.
W. E. Adams, Central Okanagan Lands, Ltd., Kelowna, B.C.
L. O. Armstrong, Lecturer, C.P.R., Dept. of Natural Resources, Calgary, Alberta.
John Anderson, Corporation of Penticton, B.C.
T. H. Boothe, Farmers' Institute, Naramata, B.C.
J. R. Ballingal, Fruit Growers' Union, Penticton, B.C.
R. A. Barton, Southern Okanagan Land Co., Penticton, B.C.
W. J. E. Biker, Nelson District, B.C. Government, Nelson, B.C.
F. N. Brown, Trail Fruit Fair Association, Trail, B.C.
Alex. Beatty, Penticton School Board, Penticton, B.C.
Mrs. F. N. Brown, Trail, B.C.
F. H. Barnes, Dept. of Agriculture, Vancouver, B.C.
O. J. Bergoust, N.E. & N.W. Kootenay, Revelstoke, B.C.
E. Foley-Bennett, President, Board of Trade, Penticton, B.C.
Thos. Bulman, Okanagan Dev. & Orchard Co., Kelowna, B.C.
Arthur Barnard, Dist. Fruit Growers' Assoc., Notch Hill P.O., Blind Bay, Shuswap Lake, B.C.
Gardiner W. Boyd, Board of Trade, Bassano, Alberta.
Don H. Bark, State Engineer, Irrigation Investigation, Boise, Idaho.
W. F. Brett, Fruit Growers' Association, Armstrong, B.C.
J. Robert Brown, Indian Agent, Summerland, B.C.
W. D. Brent, Central Okanagan Land Co., Kelowna, B.C.
James Creighton, Penticton Farmers' Institute, Penticton, B.C.
W. A. Cameron, Water Rights Branch, Naramata, B.C.
James Craig, Naramata, B.C.
R. S. Conklin, Reeve of Penticton, B. C.
C. H. Cordy, Board of Trade, Summerland, B.C.
F. W. Crandall, Agricultural Association, Gleichen, Alberta.
J. J. Carment, City of Kamloops, B. C.
Arthur Chamberlain, Board of Trade, Kamloops, B.C.
D. Cameron, Vancouver Branch, Canadian Society of Civil Engineers and Corp. of North Vancouver, 1001 Rogers Bldg., Vancouver, B.C.
G. R. Castner, Fire Blight Inspector, Penticton, B.C.
H. R. Carscallen, Canadian Society of Civil Engineers, Calgary, Alberta.

R. A. Copeland, Central Okanagan Lands, Ltd., Kelowna, B.C.
Edward M. Carruthers, Belgo-Canadian Fruit Lands, Kelowna, B.C.
J. F. Campbell, Central Okanagan Land & Orchard Co., Kelowna, B.C.
F. C. Chappell, Ellison Pure Bred Live Stock Assoc., Kelowna, B.C.
J. C. Dufresne, Executive, Western Canada Irrig. Assoc., Penticton, B.C.
Edgar W. Dynes, Local Secretary, Western Canada Irrig. Association, Penticton, B.C.
E. M. Daun, Board of Trade, B.C. Hydrographic Survey, Acadia Bldg., Kamloops, B.C.
E. Davis, Water Rights Branch, Victoria, B.C.
Dr. C. W. Dickson, Executive, Western Canada Irrig. Assoc., Kelowna, B.C.
W. C. Duggan, City of Kelowna, B.C.
Jno. Davidson, Westbank Farmers' Institute, Westbank, B.C.
Hon. Price Ellison, Minister of Finance & Agriculture, Victoria, B.C.
J. W. Eastham, Dept. of Agriculture, Vernon, B.C.
P. H. Eraut, Corpn. of Dist. of Penticton, Penticton, B.C.
S. T. Elliott, Board of Trade, Kelowna, B.C.
W. J. Elliott, Principal, School of Agriculture, Olds, Alberta.
Mrs. W. J. Elliott, Olds, Alberta.
P. E. French, Asst. Prov. Horticulturist, Salmon Arm, B.C.
Wallace Flanagan, Board of Trade, Bassano, Alberta.
Jno. Faulkner, Westbank Farmers' Institute, Westbank, B.C.
L. Fetherstonhaugh, Westbank Farmers' Institute, Westbank, B.C.
W. H. Fairfield, Supt. Dominion Experimental Farm, Lethbridge, Alberta.
Mrs. W. H. Fairfield, Women's Civic Club, Lethbridge, Alberta.
G. H. Feldtman, Penticton Fruit Growers' Union, Penticton, B.C.
H. W. Grunsky, Water Rights Branch, Victoria, B.C.
Francis W. Groves, South Kelowna Irr. Co., Ltd., Kelowna, B C.
David Gellatly, Okanagan Irr. & Power Co., Gellatly, B.C.
Chas. B. Gordon, Kettle Valley Ry. Co., Penticton, B.C.
James Goldie, Okanagan Centre, B.C.
H. H. Evans, Okanagan Centre, B.C.
Ben Hoy, Horticultural Branch, B.C. Government, Vernon, B.C.
Arthur Hooker, Sec'y, Inter. Irrigation Congress, Calgary, Alberta.
Walter Huckvale, Cypress Hills Water Users' Association, Board of Trade, Medicine Hat, Alberta.
Mrs. Arthur Hooker, Inter. Irrigation Congress, Calgary, Alberta.
W. F. Hicks, Supt. Operation & Maintenance, A.R. & I. Ry., Lethbridge, Alberta.
E. C. Hunt, Horticultural Branch, B. C. Government, Grand Forks, B.C.
Geo. Harcourt, Deputy Minister of Agriculture, Edmonton, Alberta.
A. H. Huntly, Farmers' Institute, Penticton, B.C.
N. M. Hayes, Westbank, B.C.
D. W. Hays, Executive, Western Canada Irrig. Assoc., Medicine Hat, Alberta.
Mrs. D. W. Hays, Medicine Hat, Alberta.
G. N. Houston, Dominion Govt. Irrig. Office, Calgary, Alberta.

Wm. Humstane, Cent. Okanagan Lands Ltd., Kelowna, B.C.
D. B. Johnstone, Agricultural Society, Kamloops, B.C.
J. R. Jackson, Minister of B.C. Legislature, Midway, B.C.
Jas. Johnston, Board of Trade, West Kootenay Farmers' Institute, Nelson, B.C.
W. A. Joslyn, Westbank Irr. Co., Westbank, B.C.
J. W. Jones, Mayor, City of Kelowna, B.C.
Mrs. Jas. Johnston, Women's Institute, Nelson, B.C.
E. B. Knight, White Valley, Vernon, B.C.
Dr. H. Lawrence, Penticton Fruit Growers' Union, Penticton, B.C.
W. J. Lloyd, Farm Products Ltd., Lethbridge, Alberta.
E. V. de Lautour, White Valley Irrigation Power Co., Vernon, B.C.
W. H. Lyne, Asst. Inspector of Fruit Pests, Vancouver, B.C.
H. C. McMullen, Board of Trade, Banff, Alberta.
W. T. MacDonald, Soils & Crops, Dept. of Agriculture, Victoria, B.C.
Ald. N. A. McGill, City of Kamloops, B.C.
Andrew McKee, Board of Trade, Bassano, Alberta.
H. R. McMillan, Chief Forester British Columbia, Victoria, B.C.
F. McVikar, Forestry Branch, Dept. of Lands, Victoria, B.C.
A. McGaw, Inspector of Indian Dept., Vernon, B.C.
K. MacLaren, Ellison Pure Bred Live Stock Assoc., Kelowna, B.C.
G. W. McLaren, Summerland Poultry Association, Summerland, B.C.
C. A. McWilliams, Board of Trade, Summerland, B.C.
M. S. Middleton, Associate Boards of Trade Eastern B.C., Nelson, B.C.
E. W. Mutch, Board of Trade, Penticton, B.C.
J. A. Martin, City of Calgary, Alberta.
J. R. Mitchell, Board of Trade, Penticton, B.C.
Andrew Miller, Industrial Commissioner, Intern. Irrigation Congress, Board of Control, Calgary, Alberta.
Chas. Murray, Commissioner of Conservation, Calgary, Alberta.
W. R. C. Morris, Actg. Dist. Engineer for Water Rights Branch, B.C. Govt., Vernon, B. C.
J. S. Moore, Peachland, B.C.
A. K. Mitchell, 229 Pemberton Block, Victoria, B.C.
Mrs. Morrington, Penticton, B.C.
O. F. D. Morrington, Water Rights Branch, Lower Okanagan Valley, Penticton, B.C.
Wm. Pearce, Dept. of Natural Resources, C.P.R., Calgary, Alberta.
Mrs. Wm. Pearce, Calgary, Alberta.
John Power, S. O. Land Co., Ltd., Penticton, B.C.
G. H. Patrick, C. P. Ry. Irr. Dept., Strathmore, Alberta.
Mrs. S. G. Porter, Calgary, Alberta.
E. F. Purcell, City of Bassano, Bassano, Alberta.
J. C. Pearson, Ellison Pure Bred Live Stock Assoc., Kelowna, B.C.
R. Pegler, Bassano, Alberta.
J. L. Pridham, Bankhead Orchard Co., Kelowna, B.C.

Guy Pearson, Central Okanagan Lands Ltd., Kelowna, B.C.
S. G. Porter, Dom. Govt. Irrigation Dept., Canadian Society Civil Engineers, Calgary, Alberta.
J. O. Robinson, Okanagan Fruit Co., Naramata, B.C.
J. M. Robinson, Okanagan Fruit Co., Naramata, B.C.
W. H. Robertson, Dept. Agriculture, Victoria, B.C.
Dr. J. G. Rutherford, Supt. of Agriculture and Animal Industry, Dept. of Natural Resourses, C.P.R., Calgary, Alberta.
N. S. Rankin, Permanent Sec'y, Western Canada Irrig. Assoc., Calgary, Alberta.
Max H. Rukmann, Dept. of Agriculture, Vernon, B.C.
C. E. Richardson, B. C. Hydrographic Survey, Nelson, B.C.
T. Roadhouse, Kaleden Farmers' Institute, Kaleden, B.C.
J. C. Reading, Dept. of Agriculture, Victoria, B.C.
H. J. Russell, *"Free Press"*, Winnipeg, Manitoba.
Frank Richardson, Penticton A. & H. Assoc., Penticton, B.C.
E. L. Richardson, Board of Control, Intern. Irrig. Congress, Calgary, Alberta.
B. Russell, Canadian Society of Civil Engineers, Calgary, Alberta.
Chas. Raley, Dept. of Natural Resources, C.P.R., Lethbridge, Alberta.
F. Reynolds, Black Mountain Water Co., Kelowna, B.C.
M. W. Russell, Central Okanagan Lands Ltd., Kelowna, B.C.
H. G. Rowley, Black Mountain Water Co., Kelowna, B.C.
H. P. Saltring, Farmers' Institute, Naramata, B.C.
H. C. Smith, Agricultural and Horticultural Assoc., Penticton, B.C.
F. T. Shutt, Dom. Chemist, Experimental Farm, Ottawa, Ontario,
G. C. Shanton, Dept. of Agriculture, Victoria, B.C.
J. M. Stevens, Penticton Farmers' Institute, Penticton, B.C.
J. R. Standon, Kaleden Farmers' Institute, Kaleden, B.C.
C. L. Smith, Agriculturist, Oregon, Wash. Ry. & Navigation Co., Portland, Oregon.
R. S. Stockton, Supt. Operation & Maintenance, Dept. of Natural Resources, C.P.R., Strathmore, Alberta.
W. E. Scott, Deputy Minister of Agriculture, Victoria, B.C.
W. J. Stephen, Principal School of Agriculture, Claresholm, Alberta
W. H. Smith, Vernon City Council, Vernon, B.C.
R. H. Struthers, Town of Bassano, Alberta.
W. F. Schell, Central Okanagan Lands & Orchard Co., Kelowna, B.C.
Ed. Smith, Westbank Farmers' Institute, Westbank, B.C.
H. Thornber, Dept. of Agriculture, Horticultural Branch, Victoria, B.C.
S. F. Tolmie, B. C. Live Stock Commissioner, Victoria, B.C.
J. D. Tompkins, *Penticton Herald*, Penticton, B.C.
N. F. Tunbridge, Board of Trade, Penticton, B.C.
L. E. Taylor, Bankhead Orchard Co., Kelowna, B.C.
A. W. Trickey, Industrial Dev. Bureau of Calgary, Alberta.
W. N. Townsend, Armstrong Fruit Growers' Association, Armstrong, B.C.
C. Varcoe, Water Rights Branch, Kettle Valley District, Grand Forks, B.C.

H. J. Wells, Naramata Farmers' Institute, Naramata, B.C.
R. M. Winslow, Dept. of Agriculture, Victoria, B.C.
L. W. Wheatley, Assistant Secretary, Western Canada Irrig. Assoc., Calgary, Alberta.
R. B. White, S. O. Land Co., Ltd., Penticton, B.C.
E. Stuart Wood, Agricultural Association, Kamloops, B.C.
D. H. Watson, Agricultural Association, Summerland, B.C.
G. D. Walters, Hydro. Surveys, Dom. Govt., Calgary, Alberta.
M. P. Williams, Okanagan Centre Farmers' Institute, Alvaston, B.C.
F. E. R. Wollaston, Coldstream Estate Co., Coldstream Ranch, Vernon, B.C.
G. J. Coulter White, Summerland Fruit Union, Summerland, B.C.
E. A. Weir, "*Farm & Ranch Review,*" Calgary, Alberta.
C. E. Whistler, Oregon State Hort. Society (Foreign Delegate), Metford, Ore.
James J. Warren, Kettle Valley Ry. Co., Penticton, B.C.
R. G. Williamson, Cypress Hills Water Users' Association, Maple Creek, Saskatchewan.
F. H. Williams, Maple Creek, Saskatchewan.
Wm. Young, Comptroller of Water Rights, Canadian Society of Civil Engineers, Victoria, B.C.
Mrs. A. T. Young, 321 Niars Street, Victoria, B.C.

CHAIRMAN: Mr. Pearce, Chairman of the Committee on Resolutions, has a word to say.

Mr. PEARCE: Your Committee beg to report progress and ask leave to sit again. We would also like to have any further resolutions handed in at once, and the Committee on Resolutions would like, immediately at the close of this session, that any of the movers or seconders who may have any explanations to point out as to their consideration, should appear before the Committee.

The following resolution was handed in to the Committee, but the Committee considered it a matter more for the convention in general to consider. I cannot find it now but the purport of it was the advisability of appointing delegates from this convention to attend the meeting of the International Irrigation Congress to be held at Calgary in October, and also I understand, the Oregon Irrigation Congress in the near future.

Mr. RANKIN: Mr. Pearce and Mr. President, it is by attending such conventions, that we are able to bring such men as Mr. Smith and others here to-day. That is why we ask your support for this resolution.

Mr. SMITH: Mr. Chairman, I have with me a few pamphlets dealing more particularly with the feeding of hogs and building up the dairy herd, and if any are particularly interested, I will be glad to give them copies. They have synopses of four or more lectures a little different than the one I have delivered.

CHAIRMAN: There will be a meeting of the Executive immediately following the adjournment. The meeting is adjourned until eight o'clock this evening.

Following the morning adjournment, a meeting of the Executive was held, the following members being present: Messrs. Pearce, Dufresne, Foley-Bennett, Huckvale and Dickson.

Dr. C. W. Dickson was elected to the chair and the Permanent Secretary, Norman S. Rankin, read the minutes of the Executive meeting held at Lethbridge, August 6, 1913, and also the minutes of the meeting of the Executive held at Vancouver, December 15, 1913.

Moved by E. Foley-Bennett, seconded by Mr. Dufresne, that the minutes be approved as read. Carried.

The Secretary also reported that two meetings of the Programme Committee were held at Sicamous during the month of May, 1914.

A bank balance of $1,075.84 was reported, this having been audited along with accounts and vouchers, and found correct.

Moved by Mr. Pearce, seconded by Mr. Huckvale, that the Secretary be instructed to request the Department of the Interior to furnish advance copies of that portion of the annual report containing Dr. Rutherford's address, in order that the same might be distributed to those interested. Carried.

Mr. Dufresne also led a discussion as to the advisability of withholding from publication resolutions that had not the sanction of the Association, but no motion was made in the matter.

Moved by Mr. Pearce, seconded by Mr. Huchvale, that the meeting adjourn. Carried.

In the afternoon, the delegates and visitors attended the Penticton annual regatta as guests of the Aquatic Club and the various events were followed with great interest and appreciation.

TUESDAY EVENING SESSION, AUGUST 18, 1914.

CHAIRMAN: The delegates will kindly come to order while the local secretary makes an announcement.

The local secretary, Mr. Dynes, thereupon acquainted the delegates with the arrangements made for boat sailings and informed them as to tickets and accommodation.

CHAIRMAN: Mr. H. R. MacMillan, Chief Forester for the Province of British Columbia, who was to have addressed us, has been called away and it will be impossible for him to give his paper that he had prepared for the convention, but this will be embodied in the annual report, and while speaking of him and his department, I want to call your attention to the charts and also to the mottoes on my left. These were supplied by his department, and you will find them of interest, particularly the mottoes.

Mr. MacMillan's address follows:

FOREST FIRE PROTECTION.

Mr. MACMILLAN: Mr. President, ladies and gentlemen,—It is unnecessary to argue the benefits of forest fire protection before a body of men dependent upon the water from mountain streams for the irrigation of their crops. The irrigation farmers of Canada and the Western States early learned by bitter experience the effect of the forest on stream flow. Old settlers in this valley have told me that the forested streams give off water gradually, delay the melting of snow and act as reservoirs holding back the run-off, so that a large proportion of it is available in times of drought. Deforested water-sheds, swept clear by fire, do not protect the snow against the early sun, nor do they absorb the falling rain; the deforested water-sheds in comparison with forested water-sheds is as a tin roof contrasted with a sod roof. The deforested water-shed shoots the rain into the valleys below, produces floods in the wet season, with their attendant erosion, destroying property. Then, when the water is most needed, the streams run dry.

In every important irrigation district of Western Canada there is, I believe, insufficient water to supply fully the land requiring irrigation. The streams all rise in forested watersheds, and should the amount of water available for summer use be reduced by destructive forest fires, the area irrigable is automatically reduced, and at the same time it becomes necessary to undertake serious expenditure for the construction of artificial reservoirs, and the control or prevention of floods. It is now realized that the regulation of any stream must be undertaken at its source by the maintenance of its forest cover.

The amount of land to be brought under cultivation in this Okanagan watershed depends largely upon whether we succeed or not in keeping the hills green.

Every possible precaution is now being undertaken to prevent forest fires. The support of the public is sought by signs and posters distributed throughout the country. No one is allowed to light a fire through the summer without a permit. A constant patrol is maintained along the railroads now constructing through extremely inflammable sections of the Okanagan watershed. Every possible source of fire has been studied and provided for.

Then, knowing that fires will occur, provision has been made for discovering and fighting them. Forest guards patrol every district. A high level trail has been constructed around Okanagan lake. Two mountains controlling a view of the whole Okanagan watershed have been connected with the district office by telephone. During the danger season, a man on duty on every mountain spots the first signs of fire and telephones its location to the nearest patrolman. The principle of fire protection is that a man can put out 100 small fires more easily than 100 men can put out one large fire. Every effort is, therefore, made to get the fire while it is small and controllable; as the value of the watersheds for irrigation increases, the measures for fire protection will be intensified. Personally, I believe that two or three million acres of forest in the stream headwaters are worth protection for their water protection value alone. There may be some persons who do not agree—to them, I wish to point out the value of the timber crop. The development of the timber industries in this district has been held

up by lack of transportation. Yet, during 1913, not an especially good year, 30,000,000 feet of timber were manufactured, resulting in a labour expenditure of $450,000 in this valley. The timber revenue to the Government from this district was in 1913, about $35,000. Timber manufacture in this district has not yet started. There is now standing here about a billion feet of merchantable forest, twice as much as is cut for lumber in a year in the whole of Canada. Such an extensive and profitable asset certainly merits protection from fire.

You, who are interested in irrigation, have been our best friends. I wish to thank you, both for your general support of forest protection and for the active measures individual companies and persons have here taken personally to prevent and control fires.

CHAIRMAN.: The two other speakers for this evening are Mr. McMullen and Mr. Houston. On your printed programme, you will notice that Mr. McMullen's name has been given first. It has been decided that these will be reversed this evening and Mr. Houston will speak first, owing to the fact that his paper may provoke some discussion and we wish to give you an opportunity to discuss it before the end of the meeting. Mr. G. N. Houston, of the Department of the Interior, Irrigation Branch, Calgary, will now address you on the subject.

THE STORAGE OF WATER FOR IRRIGATION.

Mr. G. N. HOUSTON: Mr. President, ladies and gentlemen,—Irrigation originated away back in the dawn of civilization as a matter of necessity. Just when water was first applied artificially to produce or increase the yield of agricultural crops is not definitely known, but here and there through ancient history we get glimpses of the art sufficient to indicate that it was known and practised from the earliest times.

We get a little idea of the irrigation institutions of this early period through one of the Grecian historians who gives us the first description of a storage proposition as follows: "There is a plain shut in on every side by a range of mountains and there are five gorges in the mountains. From this range of mountains then that shuts in this plain, there flows a great river the name of which is Aces; it formerly being divided into five separate channels used to irrigate the lands of the nations mentioned, being conducted to each nation through each separate gorge, but since they have become the subjects of the Persians, they have suffered the following calamity; The King having caused the gorges of the mountains to be blocked up, placed gates at each gorge, and, the passage of water being stopped, the plain within the mountains has become a sea as the river continued to pour and had nowhere an exit. The people therefore, who before were in the habit of using the water, not being able to use it any longer were reduced to great extremities; for though in winter Heaven supplied them with rain as it does to other men, yet in summer, when they sowed millet and sesame, they stood in need of water. When, therefore, no water was allowed to them, they and their wives going to the Persians, and standing before the King's palace, raised a great outcry, but the King gave orders that the gates should be opened towards those lands which were most in need, and when their lands were satisfied by imbibing water

these gates were shut, and he ordered others opened to those next in greatest need, and as I have been informed, he opens them after he had exacted large sums of money in addition to the tribute."

This little incident which took place about 2,400 years ago, shows us that even at that early date the value of storage as an adjunct to irrigation was well recognized, and incidentally that the institution of graft is not of modern origin.

In the early development of irrigation on this continent, there was plenty of water in the streams and no one thought of conserving it. Increase of population and a cycle of dry years suddenly brought the irrigator to the realization that if the water which he allowed to run past his headgate during the winter months and the flood stages of the stream, was in some manner held back and allowed to come down at such times as he needed it and in such quantity as could be handled, it would mean to him the success instead of failure of his crops.

Consequently reservoir sites were acquired and storage of water begun, In this, as in the development of all other new projects with no precedent to guide them, they proceeded with caution and bought the small basins, and constructed inexpensive dams. As the value of irrigated land increased and the demand for water became greater, the reservoirs were found to be too small and they had to be enlarged and new ones built. This necessitated the acquiring of new land, which, in the meantime had increased in value, and thus the process of development went on until in some cases they paid for the last enlargements ten to fifteen times the amount for which they could have been bought when the reservoir was first built. To a certain extent this held back the development, as many times the land had become so valuable that they could not afford to turn it into reservoir sites. A great deal of money would have been saved the settler if he had had the foresight to acquire, in the beginning, sufficient land for the maximum capacity of the reservoir.

Today no irrigation project should be considered complete until all possible storage in connection with it has been investigated, planned for, and the necessary sites acquired.

Reservoirs for collecting and penning back water for future use in connection with irrigation may be grouped into two classes.

(1) Reservoirs formed by damming the stream itself.

(2) Reservoirs located more or less remote from the stream and filled by means of a canal. Occasionally, we find a reservoir which comes under both classes.

RESERVOIRS ON THE STREAM.

This class of storage is usually located near the head waters of the stream, and in general, is characterized by a large basin with comparatively little fall from the upper end to the lower, where the stream passes through a narrow gorge used as the dam site. Within certain limits, the larger this basin and narrower the gorge, the better the site.

There are many advantages in this class of storage. Being located usually in the mountains at high altitudes, the land is not so valuable for agricultural purposes and can be acquired at a low price. These reservoirs are also valuable in

preventing floods which originate above. The flood is caught regardless of priority and turned out to earlier appropriators below in amounts which can be handled.

When a reservoir is constructed on a stream the dam must be of a very substantial type with large spillway and outlet capacity to provide for floods. This makes the construction cost high and in order to warrant the expense a large storage capacity is necessary. On account of this relation between the cost of the dam and the size of the basin the sites of this class are usually developed last, and unfortunately there are comparatively few of them.

RESERVOIRS REMOTE FROM THE STREAM.

These are usually situated on the plains near the land to be irrigated. They consist in general of large comparatively shallow basins, sometimes a natural depression and sometimes formed by an earth embankment or dam across one side of the area. As these reservoirs are filled by a canal from the stream their value depends to a great extent upon the capacity of this inlet ditch. Unless there are sufficient reservoirs on the head waters of the stream to control the flood and let it down gradually it is evident that this inlet ditch must be of a capacity sufficient to fill the basin during the run of high water. Unfortunately the flood period in the arid districts is of comparatively short duration. Hence it requires in many cases, very large inlet ditches.

Since the inflow to these reservoirs can be regulated by the headgates on the stream very little spillway capacity is necessary unless the site has a large drainage area above it. The outlet works need to be only of a capacity sufficient to supply the ditches below.

These conditions coupled with the fact that there is nearly always at hand at these sites plenty of material with which to build a good earth dam, makes the cost of construction of this class of storage less expensive than if constructed on the stream. On the other hand the area flooded by this class of reservoirs compared with their capacity is usually much larger than in the case of mountain storage, resulting in a comparatively larger loss due to seepage and evaporation.

If the headgate of the intake ditch is located below any part of the irrigated land, the waters returning to the stream from this land will compensate to some extent for this additional loss.

With regard to seepage from these reservoirs, it is not only the value of the water lost which must be considered, but also the value of the land below the reservoir, which is rendered useless for cultivation from this cause. The amount of seepage depends upon the depth of water in the reservoir and the character and formation of the material constituting the basin. It will therefore be evident that in order to determine with any degree of accuracy the amount of the land which will be water logged or alkalied as a result of this seepage as well as its position below the reservoir, it would be necessary to make exhaustive test wells on the site and also for some distance below it.

As this adds to the expense of building, it is usual to confine this investigation of the geological formation to the site of the dam only, and then take such precautions during the construction as the conditions indicate will render loss from this cause a minimum.

If the water stored carries salt or clay the tendency is for the seepage to become less as this suspended matter is deposited over the bottom of the basin.

In the case of irrigated lands situated near the mountains and obtaining their water from the streams whose source is the melting snow, this class of reservoirs has a marked advantage over the other class in that the holding of the water in the shallow basins for some time before applying to the land raises the temperature so that it retards to a less extent the growth of the crops. Reservoirs of small capacity can be advantageously used on the farm to store the night run of water. In some systems it is the custom to waste this into a coulee or if this is not possible the farmer must irrigate night and day until he has finished, but with a small reservoir he can turn the water into it at night and use double the amount next day.

The reservoir site having been selected, the next important matter is the dam There are four general types of these, characterized by the material of which the bulk of the dam is constructed, viz: earth, timber, loose rock and masonry dams.

The choice of one of these types will usually depend upon the following conditions:—

(1) The amount of money available for the work.

(2) The character of the materials near the site which can be used in the construction.

(3) The character of the foundation.

(4) The depth of water it is supposed to pen back.

When the Persian King, of whom Herodotus wrote, constructed his dams and gates to pen back the waters of the river Aces, it is probable that the designer planned the most efficient and permanent structure known at that time without considering the element of cost. The problem which usually confronts the engineer of to-day however, is to build the most efficient and most permanent structure possible for a limited sum of money.

This introduction into the problem of the element of minimum cost has had a marked effect upon the design of dams in recent years. It has forced the profession out of the rut of building expensive masonry dams depending upon their weight alone for stability, and has been the cause of the development of many new forms, notably those whose strength depends largely upon their arched shape.

In considering any material for dam construction, there are three elements to be taken into account.

(1 Impermeability or water-tightness under pressure.

(2) Its power of resisting the water pressure stored behind it.

(3) Its permanency when in place.

EARTH.

Earth is one of the commonest materials suitable for dam construction, and hence there are more dirt dams in existence than any other type. Earth is not water tight, that is, water will pass through it at varying rates depending upon

the size of the particles and the pressure. It may be made practically water-tight however, by selecting the material and compacting it thoroughly during construction. Where the materials are at hand for the purpose the upstream face may be covered with a mixture of clay, sand and gravel called puddle, forming a practically water-tight curtain. This puddle is often placed in the body of a dam as a vertical core wall. Concrete and other masonry is sometimes used in the same way. In hydraulic fill dams an impervious core of fine clay is deposited in the centre and the coarser materials nearer the outer edge by the action of the water.

However, the usual method when reasonably good material is available, is to build the dam of practically the same material throughout, that is without resorting to artificial mixtures for faces or core wall. When properly used it is one of the best and cheapest materials for dams.

The usual cross section of an earth dam is a very flat upstream slope depending upon the character of material in the dam. This usually varies from 3½ to 1, to 5 to 1. A down stream slope from 2½ to 1, to 3 to 1, crest 16 feet, freeboard 10 feet. The tendency in America is to make the upstream slope steeper and endeavour to protect it from ware action by reinforced concrete paving. In some cases this has not been found satisfactory, but it should be very efficient if properly designed.

While timber is adaptible to dam construction as regards water-tightness and strength, it is more or less perishable unless completely submerged, and therefore is not generally used in important dams, but is confined to low diverting weirs and temporary structures. The writer has seen however, several timber crib dams, which were in a fair state of preservation after twenty years.

LOOSE ROCK.

Where good earth is not available loose rock is next higher in order of permanency and cost. In general dams of this character consist of a mass of loose rock of varying size, dumped on the dam site, and brought to uniform slopes on either side. A water tight curtain is constructed on the upstream face or in the body of the dam to hold back the water. This curtain may be made of earth, concrete or masonry, steel plates or timber. Dams of this character are well adapted to isolated mountain sites where earth is not available in proper quantity or quality and where the cost of cement for a masonry dam would be prohibitive.

MASONRY.

Up to the early nineties the best quality of Portland cement used in Canada and the United States was manufactured abroad, and its price ranged from $2.50 to $4.00 per barrel. To-day we can buy higher grade Portland manufactured at home for a price ranging from $1.00 to $2.00 per barrel. It has also been demonstrated that Portland cement can be re-ground with 50 per cent to 60 per cent of certain classes of rock, without materially reducing the strength. Hence masonry construction can be considered to-day, in connection with dams, where a few years ago it would not have been thought of.

The older masonry dams were build with stone laid in cement mortar and frequently faced with cut stone masonry. To-day, however, concrete seems to be the favourite material.

Yard for yard the most economical form of concrete construction is what is known as "Cyclopean Masonry." It consists of massive concrete in which is embedded large irregular pieces of rock. In case the materials are limited, or for any other reason, it is desired to reduce the amount of concrete, steel rods may be inserted forming reinforced concrete which is one of the most valuable of modern building materials, when properly used, but one of the most dangerous when in the hands of the inexperienced or unskilled.

FOUNDATIONS.

Solid rock foundation is the most desirable for masonry dams, although not necessary for the reinforced concrete dams of the Ambursen type.

Loose rock dams can be built upon good earth or rock foundation. Earth dams are most adaptable to earth foundations; if care is used in bonding they can be built upon rock. Soundings should be made on any proposed dam site to determine what the character of the foundation is for at least a depth below the surface equal to the depth of water to be stored, unless it is in solid rock. Many failures of dams can be traced to the lack of this investigation.

LIMITING THE HEIGHTS OF DAMS.

Earth limited in good practice, from 100 to 125 feet. Loose rock dams about the same. Masonry dams, the limit at the present seems to be about 325 feet.

Priority of appropriation and beneficial use are considered the foundation principles upon which irrigation law and its administration is based. As storage of water for irrigation purpose developed, it was recognized that these principles would have to be modified somewhat. To take a simple case, suppose there were four appropriations from a certain stream for direct use through ditches. The fifth appropriation is for storage. Appropriation No. 6 is for direct irrigation.

If the principle of first in time, first in right, providing the water is put to beneficial use, be applied to this case, No. 5 will begin filling his reservoir as soon as the first four appropriations have their full supply. No. 6 will be obliged to wait until the reservoir of No. 5 is filled before he can get any water. By that time his crops may be ruined. Any water coming down later is of no use to him nor can it be stored, as the reservoir of No. 5 is filled, hence it would be wasted, thus defeating the purpose for which the storage was provided, viz.; conservation. In order to meet this condition the law recognizes two classes of beneficial use, viz.; immediate and deferred. It is assumed that water delivered for direct irrigation is to be applied immediately, and therefore should take precedence over storage rights, hence all laws governing this point usually provide that no water shall be delivered to reservoirs for storage until all demands for direct irrigation have been satisfied.

The greater part of the water which can be stored in northern climates runs off during the high water flow of May and June. If the right to store water is granted, independently of direct irrigation rights, as is usually the case, there will come a point in the development when the two will conflict.

This occurs about the time when the direct appropriations plus the appropriations for storage equal the average run off during the cropping season. As soon as the total reaches this point any further appropriation for direct irrigation, will, in low water years, have to be supplied from water which has usually gone into reservoirs. As direct appropriations increase as the water available for storage becomes less and less, and the land depending entirely upon reservoirs for water will suffer

In some quarters the practice of fall and winter irrigation is increasing and under the plea of direct irrigation, is demanding water which has heretofore been used for storage. In the state of Colorado, these conditions have reached a climax. Direct appropriations have been granted to such an extent on some streams that they not only encroach upon storage water in low water years but threaten it in average years and, if continued, is looked upon by owners of reservoirs as a menace to their property. Remedial legislation has been suggested seeking to place storage and direct irrigation rights on an equal footing. This would appear to be a step backwards and result in endless litigation. A better method would be to limit the appropriations from any stream to a quantity which it could furnish in at least three out of five years and to consider all applications of water to land between harvesting in the fall and seeding in the spring, not as direct irrigation with preferred rights, but as a form of storage to be taken from the stream in its order of priority with reservoir water.

We have been lavishly wasteful of natural resources, but we are just entering upon a period in the economic history of civilization which is to be characterized by conservation. Irrigation offers a large field for the application of this principle. The farmer who applies the water to the land, the engineer who designs the structures, and those who frame the laws under which the operation of irrigation systems are carried on, should labour with a common purpose of making every drop of water do its share in crop production, and to this end, the storage of water will be a most important one. (Applause.)

CHAIRMAN: Some time now will be devoted to discussion, if there are any questions or points any of the delegates would like to bring up in connection with the paper.

Mr. CRANDALL: I would like to ask Mr. Houston, if he has had any experience in storing water in reservoirs and on an average, about what percentage of waste or seepage do you figure that you are going to run up against.

Mr. HOUSTON: That is very difficult to answer off hand, because it depends entirely upon the character of the earth or reservoir site. If it is sandy, fifty per cent may disappear before the irrigation season is over, that is, actually lost. In other cases, the usual in arid areas, at altitudes of about 6,000 feet,

would be something like a quarter of an inch a day. That is a little heavy perhaps.

Mr. CRANDALL: I would like to ask further the advisability of storing wherever it is possible to store, water that comes from mountain streams from a source of snow or ice, and also as to moderating the temperature before using it upon the soil or crop.

Mr. HOUSTON: I do not know that I quite understand the question. You wish to know the benefits which comes from storage of water from snow?

Mr. CRANDALL: So far as moderating its temperature before being used.

Mr. HOUSTON: If stored the temperature would be raised according to the length of time, and if the reservoir were in the form of a shallow basin, with a large area exposed to the sun, the temperature would be raised very materially up to as high as probably 65 to 70 degrees.

Mr. DON H. BARK: I should like to ask how much evaporation loss takes place from the ordinary reservoir and as to how that would compare with the loss in evaporation tanks usually used for determining the evaporation of water.

Mr. HOUSTON: I don't know that I have accurate data, but I know this; that the evaporation from a reservoir surface will usually be more than from a tank, because it is subject to different conditions It usually gets the currents of wind and air, where over a small pan for evaporation, it is more or less protected.

Mr. BARK: On the other hand, a small tank three feet in diameter and two feet deep, becomes much warmer.

Mr. HOUSTON: Is it not usually the case that they place the tank in the reservoir itself? That has been my custom wherever measuring the evaporation independent of seepage. We would immerse the tank itself in the reservoir and endeavour to keep the two the same temperature.

Mr. BARK: How does that evaporation from that tank suspended in the reservoir compare with the evaporation of the tank in soil. Is it more or less?

Mr. HOUSTON: I do not know that I have had an opportunity of comparing the two. You would have to, of course, place the tank you were comparing very close to the reservoir banks in order to get the same conditions as far as possible. I would think if investigations of that kind are going to be carried out, that the tank had better be immersed in the reservoir itself. Of course, you have to contend with the matter of waves slopping over in the pan.

Mr. CRANDALL: In irrigation systems where the water is secured by flooding, there is usually a large amount of silt carried in solution. Now, my experience

has been that when this water is stored in reservoirs, you lose a large amount of this silt for actual use on your land. Is there any portion of that carried in solution, which is not discernible beyond the reservoir usually, that would be beneficial to the crops?

Mr. HOUSTON: The amount of silt which is carried, I think, in the ordinary system, would be rather insignificant in the matter of the development of the crops, but anything which was in solution, any vegetable matter in solution in the water, would naturally go on to the fields and be used to increase the fertility if that was the kind of material it was; but clay in suspension when it gets to the reservoir, will settle, except the very finest of the clay. Usually there is a very fine material in reservoir water that does not usually settle on the land. The water will wash away more than you put on.

CHAIRMAN: If there is no further discussion we will call for the next item on the regular programme, and this item you will find will be one of the treats of the Convention. I will ask Mr. H. C. McMullen, late General Live Stock Agent, C.P.R., Alberta, to speak to us concerning.

LIVE STOCK ON AN IRRIGATED FARM.

H. C. MCMULLEN: Mr. President, ladies and gentlemen,—One would need to be an inspired poet, or a very skillful word painter, to do full justice to the marvels of beauty contained in this delightful city and valley selected for the sittings of the Eighth Annual Convention of the Western Canada Irrigation Association.

I desire to take advantage of this occasion to extend my sincere sympathy to those who are so very unfortunate as to have been deprived of the privilege to-day conferred on us, of feasting our eyes, and delighting our souls, in the great natural beauty of this district.

"Okanagan," "Penticton," these be names to conjure with, and when we gaze upon the waters of your lake, lying, like a sheet of molten silver, in the shadow of those grim and towering peaks, standing sentinel-like to guard the destinies of a happy contented, and progressive people, we cease to wonder at the unanimous action taken at the close of the Convention held in the city of Lethbridge last year, when Penticton was chosen as the meeting place for the Congress of 1914.

And I may say that this is no disparagement to the beautiful and progressive City of Kamloops, which was your only competitor for the honour of entertaining this the Eighth Annual Convention of delegates from perhaps the most important organization in Western Canada.

Irrigation as an aid to success in solving some of the many problems confronting the man engaged in agricultural pursuits, has come to be recognized as an exact science, and, the farmer who is ambitious for results, and honestly desirous of obtaining the best net returns from his land and labour with the minimum of uncertainty, must be equipped with the most up-to-date knowledge,

and methods, obtained as a result of actual experiment and demonstration by those who have given of their thought, time, and means to arrive at conclusions.

The average farmer is too busily engaged in the consuming task of making a living for himself and family to engage in experimental work; he is perforce obliged to defer to the opinions of men who, perhaps by reason of longer experience, or more favourable circumstances, or who through a system of organized effort have been enabled to arrive at demonstrated facts.

He must also largely depend on the assistance of the Government bureaus, and departmental officers to secure such information of a practical nature as will eliminate many of the risks he would otherwise be compelled to take, and, while I shall have something to say a little later about the matter of Government assistance I desire to say here and now, that, never in the history of the world, has there been as much work of value, done by the National, State, Dominion and Provincial authorities as is being carried on to-day.

The function of such an organization as this, I take it, is to gather and disseminate information that will be available and of practical value to the every-day farmer, who is in a measure shut out from the sources of knowledge open to the organized forces of this Association, and, we are here for the purpose of presenting such known facts as pertain to the science of irrigation in the light of new discovery, also to discuss the best means of applying the methods incident to an old practice.

It is a recognized fact, that the value of any idea lies wholly and entirely in its application; this is a hackneyed expression, but nevertheless most worthy of serious and continued consideration, and, the man who accepts this and combines it with his business will secure the best and most lasting results; as an idea, or discovery, is in itself valueless, its worth lies in the use we make of it.

It is not difficult to find today, men who are imbued with the idea that irrigation is a more or less modern practice, some going even to the length of dubbing it, a new-fangled fad, but there could be nothing further from the truth or more at variance with the facts.

Irrigation has been practised successfully for thousands of years, and we have historical evidence, that, not only has there been more satisfactory results obtained in crop returns than is possible in humid regions, but, that, under this system fertility of the soil has been conserved to a greater degree. These statements are substantiated by a series of statistics gathered by the Department of Agriculture in the United States, and show average yields during a period of forty years. I am not going to quote these figures as they are readily obtainable in the form of departmental reports.

There is however another phase of the question that should prove of supreme interest to the investigator, and to the student of political economy. The highest civilization of the past has always been found in irrigated sections, as witness Palestine, Syria, Persia and India.

In Asia Minor and Central Asia we find the remains of great cities, surrounded by ruins of irrigation works. In the new world, the Incas developed the western slope of the Andes. While in Mexico the high civilization of the Aztecs was developed on the arid plateaus of that unhappy country.

It may be asked why these attempts to conquer the arid wastes by irrigation failed. Was it because of the failure of the soil to produce, or was it because the demonstrated richness of the people attracted the attention and avarice of the warlike invaders? The comparatively recent action of the Spanish conquerors of the Aztecs in Mexico and the Incas in Peru is suggestive of the true story.

In Japan where the farmers realize that the crop must be irrigated, and the land fed, irrigation has been practised for more than four thousand years. The late Professor F. H. King in "Farmers of Forty Centuries" says, Japan produced and applied to her fields, in 1908

23,850,295 tons of human manure,
22,812,787 tons of compost,
753,074 tons of commercial fertilizer (imported),
1,404,000 tons of fuel ashes,
10,185,500 tons of green manure products, grown on hill lands.

All of this was applied to 14,000,000 acres of cultivated fields, and, it should be emphasized that this is done because as yet she has found no better way of permanently maintaining a fertility capable of feeding her teeming millions. What is the answer? Japan is not a meat eating country as the term is understood by us, there is practically no live stock owned or bred in the Orient. Horses are not extensively used as a means of transport in a country where the value of a man lies in the width of his shoulders and the strength of his back giving him the ability to carry a load, or run in a jinricksha.

As a result of these conditions the farsighted Orientals, recognizing the value of irrigation as an aid to intensive cultivation, are also seized with the necessity for conserving the fertility of their soil, to the end that the unborn millions may not perish from the face of the earth.

In the absence of live stock as a source of natural fertilizer these people have for centuries supplied the deficiency by the use of artificial or commercially produced plant food, and, in the light of their experience we may well ask ourselves the question "What would have been the result in that densely populated land had the 'little brown man' pursued the selfish method so common to certain sections of our own rich and productive country?."

Admitting as all thinking men do, that fertility must be conserved, there remains only the question, "How best to accomplish this with the least outlay and the best returns?."

Irrigation applied scientifically as it is now done, is beneficial in any phase of agriculture, this is a demonstrated fact, but it is not the only fact of interest to the properly constituted husbandman. In the application of plant food, whether in the form of natural manure, or commercial fertilizer, there has not yet been discovered any method whereby one may secure such an equitable distribution of the necessary constituents as by the even flow of irrigation waters.

In the matter of selection of fertilizer, so vitally necessary in sustaining the life of a farm, I do not know of any two systems or branches of agriculture that could be more profitably and logically connected, than the growing of grains, fruits, and fodder plants, together with the breeding and feeding of live stock,

the one is absolutely dependent on the other, and as the results attained by men thoroughly versed in this practice have demonstrated that maximum production of fodder plants have been secured on irrigated farms, it would seem there should be no difference of opinion on this point, but apparently there is, or else there is in many cases an indifference that is difficult to explain.

Agriculture is an exact science the laws governing which are inexorable. The man who follows this rule and observes these laws is the only man who can or will be the successful farmer. It does not matter what branch he follows, he must of necessity lead his business along the lines of least resistance as demonstrated by the success of others.

Few men will have the temerity to dispute the assertion, that irrigation as a practical science has been of incalculable benefit to the agriculturalist, but, there may, and, no doubt does exist, a difference of opinion, as to how, and, under what conditions the greatest value may be derived from that practice.

I contend, and, I believe I can demonstrate that the man who applies it to straight grain growing, or for that matter, to the production of any one crop, to the exclusion of others, will make a financial failure, will become an agricultural bankrupt. We have perhaps not attained to an age, when, we can say with any degree of justification that this is true in Western Canada, but, we have had the light of many years experience shed on this question through the results obtained in some of the older states to the south.

Students of ancient and modern history are agreed that the men who have been and now are engaged in farming either on an irrigated farm in the arid districts or in humid sections of the country, and who are attempting to carry on their business without devoting a part of their time and energy to the breeding and feeding of live stock, are making a mistake that many prove well nigh irreparable.

I am prepared to admit without argument that there is a tendency to be constantly preaching to the farmer, to be offering him gratuitous advice on how to conduct his business and I do not wonder they sometimes get impatient, and, are inclined to ask why, if we are possessed of such an intimate knowledge of how these things should be done, we do not go out and plow a few acres ourselves? I have however, no doubt that, from the farmers standpoint, there is ample warrant for such question. But on the other hand, as I have before remarked, the farmer, as a rule is too busy making a living to give any time for investigation and research, and so it devolves on the business man, who makes his living off the farmer, to study these questions and publish the results of his studies, to the end that the source from which he draws his sustenance may be able to continue in his role of wet nurse.

In other words we do not want the fountain to go dry, and selfish as this may appear to the farmer we are really conferring a distinct benefit on him while protecting ourselves.

Running the entire gamut of agricultural endeavour, I do not know of any one question in which we as individuals, the business community, the State, the Nation and the World at large are more vitally interested than that of conservation of soil fertility, and I am frank to say, it is one question which a great many of our farmers seem to consider of the least importance.

Fertility is something that cannot be seen. If it could I am quite satisfied there is not one man in ten thousand who would have the hardihood, or apparent lack of intelligence to destroy it, and cart it off to the market and dispose of it as he is doing in many cases today.

That is the trouble, fertility is hidden, there is nothing tangible which appeals to the average man, nothing which may disappear in an instant leaving behind an obvious void. No, the process is more subtle than that; there may be a succession of diminishing crops as a reminder that something is wrong, but no actual hiatus to be filled immediately by the expenditure of time, labour, or money. The average business man engaged in manufacturing, milling, or packing house production, will, the minute his raw material commences to get low, in his coal sheds, his ore bins, or lumber piles, take measures to replenish the supply; if he failed in this his entire plant would lie idle and unproductive and he would be drawing on his capital to keep the business going.

The fertility of the soil is the raw material of the farmer, his cattle, his grain, his fruits and vegetables are his finished product, and, if he sends his finished product to the market without taking proper measures to replenish his supply of raw material, he will soon find himself in the awkward predicament of being obliged to draw on his capital to keep his farm going. Unconsciously he may do this and fool himself into thinking he is selling only his finished product, but the day of reckoning will surely come, and he will pay in smaller and smaller returns for his policy of waste. I sometimes think that this is not altogether unconsciously done. There is a streak of selfishness in most of us. It is developed to a greater degree in some men than in others, but in none is it more harmfully shown than in these pirates of the soil, these grain robbers who take all and leave nothing for those who come after. We have no right to rob posterity and I cannot but admire the man who has sufficient good red sporting blood in his veins to take some chances, and who will put back in the soil a fair proportion of the yield which has cost the land its life blood to produce.

It is an elementary truth that everything of value in this world comes from the soil, and if I were today advising a young man about to choose a profession, or an occupation, to select for himself some line of endeavours in which he was going to expend his talents, and to which he would devote his life, I do not know in all honesty of intention, that I could direct him to one so likely to prove agreeable and remunerative as agriculture properly followed, but, I would insist that the young man make it a part of his investment, his daily, weekly, and monthly effort to so balance the production of his farm that at least one half of the output would be marketable livestock. It is hardly necessary to repeat, but I state it as a fact, that, in England where the land has been farmed successfully for centuries that the production of live stock has always been the important part of the farmer's business. When some of us who are here today were chasing buffalo, and later cattle, in this country twenty, thirty or forty years ago, the farms were old in England, and they are producing more today per acre than they did one hundred years ago.

It is an essential part of every lease, and land contract executed in that country that the lessee binds himself to maintain a certain number of the various kinds of livestock so that the fertility of the soil may not be jeopardized. He

dare not sell or dispose of a single load of manure. That is why they are still raising crops in old England that yield largely in excess of those produced in our new western provinces.

A great deal of our land is virgin yet, but it never saw the day it would produce the crops they are raising in England year after year. I contend we cannot afford, as a nation, province, city or town, to take the chances we are taking today. The farmers of this country are intelligent. It is either thoughtlessness or selfishness or a mixture of both that is to blame for such conditions, but the agricultural community of the west has been awakened to a proper sense of responsibility in this matter, and with the insistent demand now prevailing for marketable livestock I confidently look for an early reversal of conditions which has become alarming.

It is hardly practicable to say just how many cattle, horses, sheep, or swine should be maintained on any given area of land; that is a matter which must be determined largely by local conditions. The man on the land is the man who knows best what the land will sustain.

We come now to the question of fodder for the stock. What fodder crop is the most suitable, and profitable? What will show the best returns in growth and food values for the least cost and exertion?

There are a number of fodder plants, all of which will grow in abundance in Western Canada, and each of which has proved its value on the farms of the older provinces, but I must confess that I am prejudiced in favour of good old alfalfa. The legumes are soil builders, they are all nitrogen feeders, so, it follows naturally, that, if nitrogen is the body of your soil, the plant that will gather and distribute, and retain in your soil the most nitrogen, and will at the same time build up your growing stock, and fatten your matured ones, is the fodder plant for you. We have our choice of a number of good ones but alfalfa has stood the test so successfully, and under such a variety of conditions, that I am inclined to take the same view of the plant, as did the parson who dining with one of his flock, declared of the dessert "doubtless God could have made a better berry than the strawberry, but, doubtless God never did."

One of the most remarkable instances of the variety of uses to which this wonderful plant may be put, occurred under my own observation many years ago down in the then Territory of Utah. The firm of Crawford, Thompson Crocker and Booth, large cattle breeders and dealers, a firm which occupied in that day, only in a smaller way, about the same position, filled by our old friend Pat Burns in this country today, owned twelve miles of water front on Bear River, from which they bred, grew, and fed, practically all the beef supplies for the markets of Utah, Wyoming and Colorado. They also handled the pork and pork products supply for the same territory, all of which, however they were obliged to import from the packing house districts of the Mississippi and Missouri valleys where hogs were selling at that time at about 4½ to 5 cents per pound while we bought the finished product for 35c per pound or three pounds for a dollar.

I may say that about that date, the early Seventies, the only hog to be found west of Grand Island Nebraska, was an educated pig performing at one of the theatres at Salt Lake City.

Harvey Booth, one of the firm, and a man with imagination, chafed under a condition he seemed powerless to change, and with a natural bent for investigation and experiment, one day suggested to Thompson, the senior member of the firm, that they could raise their own hogs and so escape the enormous profits exacted by the middleman, increase their own profits, and at the same time reduce the price to the consumer.

Mr. Thompson was very sceptical and inquired how Booth proposed to feed and fatten his hogs. We would as well bring in Chicago bacon as Illinois corn, he said. Booth persisted however, and declared he could raise alfalfa on the Bear River bottoms, and as he had been told that hogs could be finished on this plant, he proposed to try it. If the crop matured and it was found that they could not make bacon with it, they could at least finish their cattle on it and improve the quality of their beef.

The result fully justified Mr. Booth's experiment, and I want to say that I never saw finer hogs than were turned off the feed yards of this firm, and they were finished on alfalfa hay.

This was the beginning of the alfalfa cultivation in the west, and fully demonstrated the value of this wonderful plant on an irrigated farm.

All through Utah, through southern and western Wyoming over into Idaho, and down to Colorado, the idea grew and spread, until hundreds of ranchers, there were no farmers in that day, profited by Harvey Booth's experiment, and almost every little mountain stream in the country was pressed into service and put to work irrigating an alfalfa field.

From this beginning grew the vast system of feeding camps that now dot those old cattle states, the value of which output runs into millions. In Bitter Root valley in Montana there has been established the greatest alfalfa feeding district in the west, cattle and sheep being shipped in from all over the state, until there are now wintered and finished each year, about ten thousand cattle and one hundred thousand sheep.

After all this talk about alfalfa, let us see what the actual figures show, figures collected and verified by the Department of Agriculture in Washington. These people do not deal in generalities, but by a system of experiments and carefully checked results are in a position to say just what will be the outcome of any particular course of feeding.

We will take beef at 6c. per pound, alfalfa will bring you $20.16 per ton at present prices, timothy will bring $9.80. Alfalfa will yield three tons per acre. or a return of $60.48 in feeding value; as against this timothy will yield one and one half tons per acre giving a return of $14.70. In favour of the alfalfa you have $45.78 over and above the profit you would make on the timothy.

The food value of one ton of alfalfa equals that of one ton of wheat bran, which is acknowledged to be a very strong ration; it has the additional advantage of causing a much greater flow of milk, it is more palatable than bran, and an acceptable food means a contented cow, and you dairymen know the worth of that.

Now about the life of alfalfa, I presume that there are men in this audience who have forgotten more about alfalfa than I know, but I have taken some pains to gather the facts in this connection and I have indisputable evidence,

that the average life of an alfalfa field under proper conditions is seven years, I have known fields that were not ploughed up in forty years and were still producing, but this is not the ideal condition, as a field is apt to become sod bound if not broken up at regular intervals. However, we have evidence that this is not a short lived crop.

In all my experience in the west I have not seen land or climate better adapted to the growth and production of alfalfa than the valleys of British Columbia, and with our mild winters, and nearby markets, I would say conditions were ideal for successful breeding and feeding of livestock.

There is another point I wish to dwell on for a few minutes, that is the value of irrigation as a home builder. Just picture to yourself a farm of not over one hundred and sixty acres situated in one of the many beautiful valleys of this province, a farm well fenced, and divided into a dozen different fields, with a comfortable house, and a well built barn, necessary outbuildings, with a tree shaded walk or drive leading up from the road, with a few flower beds, and some shrubbery about the house to give an air of homelikeness to the place, with a few good horses in the stable, and some fat cattle in the corral, with a pen full of sleek Berkshires, or Chesters laying on fat for the fall killing, with the barnyard full of Leghorns or Minorcas, and over all the purring sound of the life giving water as it flows through a network of ditches to give strength and vigor to the growing crops. Is not that the kind of home to inspire patriotism in a man, the kind of a home for which a man would fight? the kind of a home that makes a man love his country and his flag. No man ever volunteered to carry a gun in defence of a boarding house. I am a great believer in the virtue of the home. No country ever attained to greatness unless the superstructure was reared on the solid foundation of homes.

A comfortable home means a contented man, a happy woman, smiling, healthy, joyous children, and, did it ever occur to you that it is almost impossible to build up such a home as this without some good live stock on it. The deadly monotony of a grain farm has driven more boys to the city, and more girls to the department store than any other factor within our knowledge.

And your boys! there is a problem if you please. How are you going to keep your boys on the farm? How keep them happy and contented, with a sustained and growing interset in their work. It is your sacred duty to create such an atmosphere of home comfort and personal liking for the business as well as implant in your boy a counteracting influence that will overcome the primal wanderlust which is an inherited tendancy in every normally constructed boy.

The hateful monotony of ploughing and seeding, with the nerve destroying wait for harvest time, with resultant periods of comparative idleness, never fails to breed discontent, while the vivid imagination of a red blooded boy, given free rein is apt to run riot, and the so called joys of city life, appealing to him as the one thing to be desired warps his judgement and destroys his loyality, ending in desertion and possible wreck of what might have been a useful life.

Now I want to say for the average farm boy, that, given proper conditions and environment, there is no more loyal, faithful and industrious soul on earth, but remember always, he is human, and just a boy.

Fifty years ago, before the age of thousand acre farms, and commercialized agriculture, before the era of steam ploughs and machine made crops, the boy was an important factor. He was born and reared on a hundred, or two hundred acre farm, a farm that was a home, a farm cut into small fields with a meadow, always there was a meadow, where after the haymaking, the horses were turned into pasture, with a wood lot where the dairy cows, and the loose stock ran during the summer; there was a little flock of sheep, grazing on the roadside, or later in the stubble fields, and following the fed stock there was always a nice bunch of growing pigs, while in the pens waxing fat would be found a half dozen two hundred pound porkers grunting with pleasure as little Jimmy made his morning and evening rounds with the feed pails; and last but not least there would be Jimmie's calf that was his very own, the calf that he watched as it grew, the feeding and grooming of which gave him much personal pleasure, and the colt that was his, how much of joy he derived from the feeding and care of old Lucy's foal, and when the time came for harnessing and breaking, the pride and satisfaction that were his was reward sufficient to compensate for it all.

This was the kind of a farm that held the boy, and this was the kind of a boy that proved a real blessing and a comfort to his parents in their declining years, and who when he had followed them to the little country church yard, took up as his life work the duties and the management of the old farm, and then prepared to rear his own family, but without the livestock you cannot have such farms and you cannot have such boys.

There is another phase of this question that is of universal interest, and should be of supreme importance to the agriculturist; I refer to the annually recurring labour problem. Wherever exclusive grain growing is practised labour trouble is always present. Not necessarily from a difficult or discontented labour element, but from inability to secure sufficient help to do the work of harvesting at the proper time. The inability to get men to plough your fields when they should be ploughed, the difficulty in getting help to clear weeds, and, I will come to that again, there is no man carrying on the operations necessary on a diversified farm, who ever has these labour troubles. If he is a bachelor, and he should not be, he can usually exchange work with his neighbours, but most of the men who have such farms and homes as I am picturing are not bachelors; they have two or three husky boys growing up, who, with the diversified farms of work on a mixed farm and the care of the growing stock, take such an interest in their daily tasks that labour troubles do not enter the scheme of things at all. The officers of the railway companies, and the officials of the Dominion and Provincial Government Bureaus, are each year greatly concerned as to how and where best to distribute the labour necessary to harvest and care for the ripening grain crops.

Even with the most elaborate and scientifically accurate reports there will be an unequal and unworkable distribution of labour. Grain will ripen unevenly, certain districts will experience a drought, or other such unusual conditions as will quickly change the outlook, and render useless all these carefully prepared reports. This frequently results in the congestion of labour in one district with corresponding scarcity in another.

Your representatives at the capitals of the country, and the heads of the transportation companies are doing everything humanly possible to solve this

labour problem for you, and yet you know what occurs almost every fall; there is either a surplus or shortage of labour.

In old Ontario and the older farming districts of the United States where the average farm is not more than one hundred and sixty acres they are always able to take care of their work, but there has been no time since I have lived in the prairie provinces when I have not heard a wail, about either too many men or not enough. The solution of this difficulty lies in reasonably small farms devoted to the production of diversified crops, and all the live stock that the land will support.

I think perhaps sufficient time has been devoted to the question of the advisability of going into the live stock branch on the farm, and I would now like to say a few words on the possible returns to the farmer, what is likely to be the amount of his profit on his land and labour as against the one crop system.

Aside entirely from the value of live stock as a fertilizing agent on the farm, and their worth as destroyers of noxious weeds, apart from their humanizing influence on the farmer and his family, there is undoubtedly large profit to be made in breeding and feeding any or all classes of live stock for the markets of today.

With the steady growth of population, with the building up of numerous and vast centres of manufacturing and industrial activity, there is a consequent narrowing of the available pasture lands and feeding grounds all over the civilized world. This has had the effect of so enhancing the market values of all classes of live stock and their products that a steady and permanent market is provided at vastly profitable figures. The day of the 4c. steer and the 5c. hog has passed and can never return. The industrial, mechanical, and professional population of the world are non-producers, and must be fed by the men who are content to pass their lives in that cleanest, most healthful, and self satisfying of all pursuits, agriculture, and those of you who have chosen that, and adopted it as your life work need have no fear of over production ever interfering with or lowering your profits below the level of a fair remuneration for your investment and labour.

The Province of Alberta produced and marketed during the year 1913, $15,000,000 worth of poultry, milk, and milk products, while the hog crop brought in $6,000,000. There was realized from cattle $9,000,000 and from horses $2,500,000, but I am sorry to say the best friend the farmer ever had, the poor despised, unlovely, maloderous little sheep contributed only $500,000 for mutton and $200,000 for wool.

However, here is a nice little balance on the credit side for the farmers of Alberta; $33,200,000 from the live stock they said a few years ago would not pay.

As an instance of the respect in which the live stock industry is held by the farmers of Kansas, I am going to quote you the figures for the year 1912 as showing the relative values of farm products for that state and year. There was produced and marketed field crops and products to the value of $216,000,000, while the live stock alone realized the enormous total of $225,000,000. These are significant figures and are perhaps a true indication of why Kansas today takes rank as the most prosperous of the agricultural states of the Union. Of

course it is just possible their state wide prohibitory law may have had something to do with this condition, but regardless of that they just keep on raising their steers.

This is all an argument in favour of increased production of live stock on the farm, but, with the acceptance by the farmer of the doctrine of improved methods in this direction, there yet remains much to be done before the conditions will become ideal.

After the farmer has succeeded in bringing his land up to a high standard of production and has stocked his farm to the limit of maintenance, there comes the very important question of how and where best to dispose of his output, and this is largely a matter of organization.

Organization is the prime factor in marketing livestock, and all the products of the farm. You will all recall the early struggles of the fruit growers of California in their efforts to market the crops with any profit to themselves.

They found themselves in possession of perhaps the richest section of fruit growing land on the continent of America. They had the very best transportation system and facilities possible to build and equip. They had growing markets almost at their door and yet they found themselves facing a deficit every year. Why was such a condition existent in a land favoured as California was?

Someone figured out that if they got together they might discover the leak. A meeting of the growers was called to devise ways and means for remedying the trouble, and in the resultant discussion, it was found, instead of their methods being wrong, there was no method at all. Each fruit farmer was attempting to dispose of his crop independently of his neighbour. Each shipper sent his output to the market that struck his individual fancy, and no regard whatever was paid to the requirements at different points.

If one car of oranges would take care of the market at a given point, it was quite likely three would be sent, and in all lines similar instances of lack of method were found.

Immediately the fault was located, a strong committee was formed to effect an organization which should have complete control of the selling end. A home office was opened, an expert employed and an efficient staff installed, whose duty it was to gather information, and make daily returns to the shipping agent, all shipments being based on telegraphic reports of market conditions.

The result was almost instantaneous, and highly gratifying, and today there is no more effective or profitable selling agency in the world than the Fruit Growers Association of California.

One of the most remarkable instances of the value of organization is shown in the work of the International Institute of Argiculture. This idea was born in the brain of a man who questioned the equity of treatment accorded the agriculturist in the matter of marketing his produce. David Lubin of California, himself a farmer, conceived the idea of a world wide organization, having for its sponsors the governing powers of pratically every civilized nation on earth, and for its object the gathering and dissemination of such information covering crop conditions, and market requirements, as would render harmless the combination of market riggers, whose object in life was to prey on the producer.

How well he succeeded is now a matter of history, although scarcely ten years have elapsed since the first meeting and orginanization was effected in the Eternal City.

I now want to say a few words about the remarkable growth of Departmental and Institute work, as carried on by the governments of almost every agricultural country in the world.

This work has been the subject of a great deal of hostile criticism, largely for the reason that, as a rule, experimental farms cannot be made to show a profit, but in many cases have to face an annual deficit. It has been argued by the critics of the system that to be of any material benefit to the everyday farmer, such stations should make a profit on the investment, and so set an example to the agricultural community on practical lines.

There would, perhaps, be good and sufficient ground for such criticism if the net result of such work were to do the same thing, and produce the same effects, as the practical farmer, only in a more expensive way, and, at a greater outlay of money. But that is not the object or practice of the various schools of the science of agriculture and the experimental farms, but rather to discover new and better methods of doing the same thing, also to learn how not to do things. As this is all in the nature of experimental work, and necessarily expensive, we cannot hope to make such work immediately profitable, except by the dissemination of the knowledge so gained, and the community is benefited by the increased returns and the greater prosperity of our farmers.

These departmental experiment stations are also doing a great work in securing greater efficiency in the fight being waged against the spread of noxious weeds, and if their efforts in this direction shall have increased the output of the farm by 5 per cent the result will have amply justified their existence.

In summing up I would say, assuming that farming is a pleasant occupation, how can you make it profitable ? Assuming that it is profitable, how can you increase your profits ? If it is profitable are you making the profit at the expense of the fertility of the land ? If you do not keep live stock, or the proper number on your farm, what are you doing to enrich the soil and to avoid stealing the birthright of posterity?

If you are engaged in agriculture in either a humid region or an irrigated district, and are producing the maximum field crops, and the number of finished live stock, are you organized against the manipulation of your markets, and to provide a fair return for your labour and investments?

If you are deficient in any of these essentials it is high time you were taking stock and improving your methods.

In conclusion I would say,breed and feed all the live stock your land will maintain, breed good stock, the best you can, but breed stock.

Thank you Mr. President, ladies and gentlemen. (Applause.)

CHAIRMAN: The meeting will now adjourn until two o'clock to-morrow afternoon.

WEDNESDAY, AUGUST 19, 1914.

At 8 a.m., the delegates and friends assembled to partake of the hospitality of the Kettle Valley Railway Company, the President, Mr. James J. Warren, having arranged an excursion in accordance with the programme. Owing to lack of time, a portion of the trip had to be omitted, but the journey was greatly appreciated and on the return of the delegates, Reeve Conklin voiced a unanimous vote of thanks for the courtesies accorded.

Dr. Shutt, Dominion Chemist, "caught in the act"—along the Kettle Valley Railway.

WEDNESDAY AFTERNOON SESSION, 2 p.m.

CHAIRMAN: The meeting will kindly come to order and while you are arranging yourselves comfortably, the Secretary will read a little bit of war news.

The first item on our programme this afternoon will be an addresse by Mr. Don H. Bark, in charge of Irrigation Investigations, Boise, Idaho. Mr. Bark was on the programme, you will notice, earlier, but as he could not get her as soon as he originally intended, it was necessary for him to come on later. Mr. Bark will address you on the subject of

THE ACTUAL PROBLEM THAT CONFRONTS THE IRRIGATOR.

Mr. Don H. BARK: Mr. Chairman, ladies and gentlemen,—The problems that confront the irrigators of the northwestern part of the United States are many in number and varied in nature, and as conditions here are more or less similar, there is no doubt but that the irrigators of the Canadian Provinces have or will encounter the same difficulties as their neighbours across the border. There are all kinds of irrigation projects in all of the various stages of development in the western part of the United States, and there is no doubt but that a detailed discussion of the methods that have been evolved for the solution of the many problems would be interesting and beneficial to the irrigators of Western Canada, but time will not permit. I have, therefore, decided to discuss the problems that have and now confront us under three main heads.

(1) The problem of learning how to properly prepare, plant, care for and irrigate a farm.

(2) The problem of securing finances with which to tide the irrigator over the lean period that almost invariably exists between the time the farm is first settled upon and the time it is producing profitable returns.

(3) The problem of marketing the crops that are ultimately produced at a profitable figure.

PREPARATION AND CARE OF AN IRRIGATED FARM.

The first problem, that of knowing how to properly prepare a farm, and how to care for, and operate it after it is prepared, is thought by most new irrigators to be the sole and only problem that will confront them. The past experience, however, of thousands of our irrigators has proven that the problem is not yet half solved when the farm is all in crop.

Other serious problems are bound to confront them either singly or collectively.

SELECTION OF A FARM.

Great care should be used at the outset in selecting an irrigated farm. Many types of soil and topography lend themselves quite readily to irrigation, but the best soil, however, and the one which works most easily, is a soil of a medium sandy loam nature of at least four feet in depth before a porous gravel, or an impervious stratum, is encountered. A medium sandy loam soil will absorb water readily, cultivate easily and will not dry out quickly after irrigation, while the heavy clay loam soils do not cultivate easily, and do not absorb water readily enough. The porous, gravelly soils on the other hand absorb water too easily, require irrigation oftener, and a larger amount per irrigation than the heavier soils, due to the losses of irrigation water which take place through deep percolation. The growing of green manure crops, or the application of barnyard manure to either the heavy soils on the one hand, or the coarse porous soils on the other hand, materially improve their mechanical condition so that they will not only produce larger crops, but they will produce them with less work and less water. The humus from the manure or from the crops that have been turned under render the porous soils more impervious, and the

At work on Kettle Valley Railway Grade (C.P.R.) near Penticton, B.C.

impervious soils more porous, thus better adapting them for irrigation farming.

The topography of an irrigation farm plays a most important part in the ultimate success of the operator. It is a common fault with many settlers from the eastern humid regions to pick out a farm that is too flat, having too small a slope to render irrigation easy. The other extreme of too great a slope is also quite as serious, for the water requires more attention and more skillful handling on the steeper slopes in order to prevent erosion. It is believed that while slopes ranging from three or four feet per mile to as much as four or five hundred feet per mile can be irrigated, the ideal slope of an irrigated farm with medium soil lies between 20 and 50 feet. With this slope less levelling of the land is required and water can be supplied more rapidly and with less attention than with either the flatter or the steeper slopes.

The new farmer should also pay particular attention to the accessibility of water for his farm. Land within a reasonable distance of the source of supply should be selected, and not where long lines of flumes or heavy fills are necessary through which to convey water to it. The adequacy and constancy of the water supply should also be investigated. The amount found necessary will depend considerably upon the climate and the nature of the soil. For diversified crops on the average soils of Idaho, Colorado, Oregon and Washington, it has been found that at least two acre feet must be delivered within the four months irrigation season beginning May 1st. Cooler climates and higher altitudes will undoubtedly require less, while lower altitudes with longer seasons or more porous soils will undoubtedly require more.

Too much stress cannot be placed upon the benefits that are derived from careful preparation of the land for irrigation. It is safe to say that not over one acre out of every ten now irrigated in the United States is prepared for irrigation in the best possible manner. It will be admitted that this is a sweeping statement and one that will not be believed by all irrigators, but it is unquestionably true. Land should be so prepared, whatever irrigation system is used, that the irrigation water may be supplied evenly to its surface, for without even application there is either waste of water and time, or loss in crop production. In all of my experience I have never found an irrigator who admitted or complained of the fact that he had spent too much time or money in the preparation of his land for irrigation; the other extreme almost invariably obtains. Time does not permit a detailed discussion of the methods that should be recommended for the preparation of the land, but it is safe to say that there is but little land that lies so well but that from ten to twenty-five dollars per acre could profitably be spent in fitting the surface for the proper application of irrigation water. More failures are due to improperly prepared land than to any other one thing, when it could so easily be done at the start by the farmer's own men and teams if too much were not attempted at the outset.

It is a common practice throughout the west for the new as well as the old irrigators to attempt to farm too much land. Forty acres well and intensively farmed is frequently more remunerative than a quarter section poorly farmed. This is well illustrated by the fact that the average production of irrigated alfalfa in Idaho as shown by the 1910 census was only 3·26 tons, while the yield of the first crop (there being three crops) at the Gooding Experiment Station

Delegates' excursion over Kettle Valley Railway, near Penticton, B.C.

during 1914 was 3½ tons of cured hay per acre, showing what care and intelligent application of water will do where the owner or operator is not farming more land than he can carefully care for. The irrigation farmers of Idaho and of the west in general are almost invariably endeavouring to operate too much land.

The farm ditches should be well and carefully made. Under the present practice in the Northwest they are almost universally too small to convey an adequate irrigation head with safety. Careful attention to this matter will frequently greatly increase the net profits that are derived from the farm.

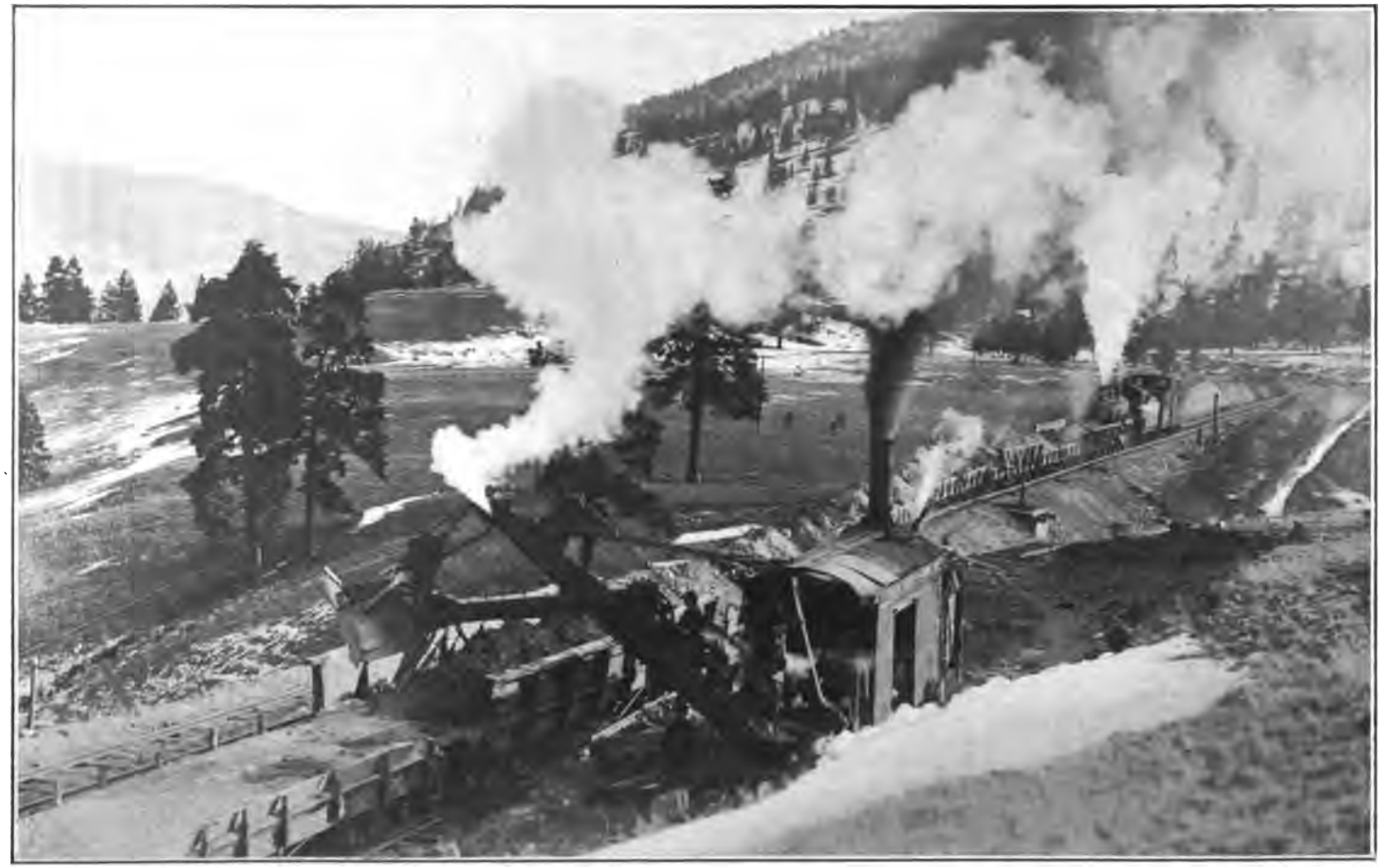
Outside of the sugar beet growing districts, or the citrus belt of California, there is usually too little attention given to the preparation of the seed bed. All crops will normally respond better if planted in a carefully prepared seed bed, and if possible there should be sufficient moisture in the soil at the time of planting to bring the crop up. Outside of alfalfa, the clovers, and other natural grasses it rarely if ever pays to irrigate the crop up. It is better practice with the grains and potatoes to irrigate the soil first and plant the crops afterwards if there is insufficient moisture to bring them up.

CROP ROTATION.

In most arid regions where irrigation is necessary the soils, though containing a sufficient amount of mineral plant food to last for years, are deficient in nitrogen and in humus. Rotation of crops such as will supply nitrogen and improve the mechanical condition of the soil is, therefore, absolutely necessary for the profitable and economical operation of an irrigated farm. Normally alfalfa is the best basis for crop rotation and soil improvement. Stock feeding is also very essential for the ultimate success of the irrigator on any normal project. The normal arid soil because of the deficiency of nitrogen will not produce more than three successive profitable crops of grain or potatoes. The third or fourth season's grain yield where no alfalfa has been grown, or no fertilizer applied, frequently falls as low as 15 bushels per acre, while hundreds of instances may be cited of wheat having produced three successive crops averaging from 60 to 75 bushels per acre after alfalfa or clover has been turned under after it has been grown for three years.

WHEN TO IRRIGATE.

Grain requires its maximum irrigation from the flowering to the soft dough period. Potatoes seem to require a moderate but uniform moisture content in the soil from the time the young tubers begin to form until they have reached their maturity. Alfalfa on the other hand has a tendency to produce the most crop where the most water is applied, although the increase that is made in the yield of the alfalfa after a depth of from two to three feet per annum has been applied is rarely proportional to the increase that must be made in the amount of water that is applied. Water should never be allowed to stand on alfalfa and a uniform moisture content should be maintained in the soil from the time the alfalfa has attained a height of six inches in the spring until the last crop of the season has been cut.



Steam Shovel at work on Kettle Valley Railway, Penticton, B.C.

AMOUNT OF WATER REQUIRED.

A comprehensive investigation of the water requirements of soils and crops has been carried on in Idaho under my direction during the past five years and indicates that grains and all cultivated crops in general, including potatoes and orchards, require 1·5 acre-feet per acre during the season if planted on medium clay loam of four or more feet in depth. Alfalfa, the clovers, and pasture, planted on the same type of soil have been found to require almost twice as much as the grains, or 2·5 acre feet per acre. The latter class of crops. however, do not require any more during the same length of season than the grains. The extra amount is required because of their longer growing season. The average annual precipitation of the localities investigated was about 12 inches, of which one-third occurred during the six growing months.

FINANCIAL ASSISTANCE USUALLY NECESSARY.

The second problem outlined at the beginning, that of securing sufficient finances with which to tide the irrigator over the lean period that almost invariably exists between the time when the farm is first settled upon and the time it is producing profitable returns, is most certainly one of the most serious problems that confront the irrigators of the northwestern part of the United States. The majority of the settlers on the new projects have started out with little or no experience, and with too little money. The land was always raw, necessitating a considerable expenditure at the outset for the clearing and levelling. An initial payment of about $3.00 per acre had to be met. A house of some kind also had to be built, and the interest and the deferred payments had to be met each year. Then, too, because of insufficient finances and need for immediate money, a great incentive almost invariably existed for hasty and careless preparation of the land. Alfalfa in many instances was not planted for the first year or two, as it seemed imperative that some grain crop be planted that would unquestionably find a ready market before the end of the first year. The yields, because of the hasty preparation of the land, have in a large number of cases been disappointing. The prices that have been received for the crops have also been low, due to the local over supply that is usually caused when so much new products are thrown on a partially developed market. The facilities for handling the rapid increase of the products of a new locality are sometimes far from adequate.

Due to the large initial expense which must be borne by the irrigator, to the many payments that must be met and to the glutting of undeveloped markets, there has usually arisen on most new projects a serious need for credit. This need usually exists for at least five years after a project is inaugurated. This problem has never yet been successfully solved in our northwestern states, for the banks have never been sufficiently strong in the new localities to take care of the legitimate needs of the irrigators. I am informed that this problem is being experienced and that it is being solved in parts of the Canadian Northwest as the irrigation company has in many cases been financially able to take

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care of the just needs of its settlers at a reasonable rate of interest. I do not mean that money should be loaned to all settlers indiscriminately, for every settler on every project is not financially responsible, but it seems highly desirable at this time that every settler that needs financial assistance, and that has the necessary security in the form of livestock, land or crops, should be able to secure a reasonable amount of funds at a reasonable rate of interest with which to help to tide him over the lean period that almost invariably exists for the first few years on every normal irrigation project.

PROFITABLE MARKETING.

The third problem that has been mentioned is that of finding a profitable market for the crops and products that are ultimately produced on the farms. This is the problem that is now confronting many of the older and better irrigation projects throughout the Northwest. The early settlers of these projects rarely realized that such a problem would ever confront them, but to many it now seems to be the only problem, for the crop production has increased so much more rapidly that either the markets, the transportation facilities, or livestock consumption, could possibly take care of them, that the consumers have been at a serious loss to know what to do with their excess crops. The solution of the problem seems to be:

(1) The careful and systematic diversification of the crops of the farms as well as of the projects, so as to furnish no more products at any one time than the railroads can haul, or than the markets can take care of.

(2) The raising of more and better livestock in sufficient numbers to consume the majority of the excess products of the farms, thus concentrating the more bulky products in order that they may be able to stand the long and expensive freight hauls from the interior.

(3) The selling or the distribution of the products through co-operative organizations similar to the organization that is selling and distributing the products of the Southern California citrus orchards so successfully.

Many new projects during the first few years of their history have produced so much hay that they could not dispose of it at a profitable figure. Some of these growers have gradually plowed up their alfalfa and rotated their crops and have begun raising potatoes, clover seed, sugar beets, etc. Others have secured enough hogs, sheep, beef cattle, or dairy cows to consume all of their products. The fruit and potato growers are marketing their produce through co-operative organizations which aim to decrease the cost to the consumers, and increase the producers' profit. The factors just mentioned tend to diversify the interests and solve the last and apparently the most serious problem that has confronted the irrigators on our large projects.

In closing, I wish to emphasize the desirability of selecting a good farm with medium soil in the beginning; of the fact that careful levelling and preparation of the soil pays big returns on the investment; that diversification of crops and crop rotation are highly important; that some means should be taken by the irrigation company to finance the legitimate needs of the irrigators during

Lady delegates to the Eighth Annual Convention, Penticton, B.C., August, 1914, at Tunnel Mouth Kettle Valley Railway.

the early stages of the project; and that the irrigators should early realize the necessity of providing for the disposal of their crops either through the feeding of livestock or the efficient distribution of their well diversified products to a market which is able to handle them at a price that is profitable to both the producer and the consumer. (Applause.)

CHAIRMAN: I am sure we have all listened with a great deal of interest to Mr. Bark's address. We will now devote a little time to discussion if any of the delegates wish to bring up any questions.

Hon. PRICE ELLISON: Did the state consider the vested right of the first holders on record?

Mr. BARK: I am awfully sorry and ashamed to tell you that they did. We hope some day that that will be changed, but our state law is based on the beneficial use of water and states that a man cannot use more water than he can put to beneficial use. It seems to me absurd to give a man to the exclusion of others, the right to the use of water twenty or twenty-five feet deep. (Applause)

Hon. PRICE ELLISON: With regard to the six inches you spoke of applying, was the orchard bearing?

Mr. BARK: Yes, sir.

Hon. PRICE ELLISON: About what would be the age?

Mr. BARK: Eight years old. It produced three hundred boxes of fruit to the acre last year and in four years' time that orchard had a total of one foot deep of water applied, not every year, but in four years. The fruit sold for a dollar a box.

CHAIRMAN: What was the rainfall?

Mr. BARK: About twelve inches a year. About four inches for the six growing months and eight for the six winter months.

Hon. PRICE ELLISON: What would be the effect of a gravel soil on the water?

Mr. BARK: It would have required more water on account of being lost through deep percolation. Probably a foot deep a year would answer, with careful husbandry. Our irrigation season is about 120 days.

Mr. CRANDALL: Do you find after the land has been irrigated a number of years that it requires the same amount of water as at first.

Mr. BARK: It does not require as much water after a few years, but I have found out something very striking about that. It is not due very considerably to the soaking up of that soil but to the improvement of the mechanical condition and fertility of the soil.

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Mr. CRANDALL: How deep does the average alfalfa root penetrate ordinary soil?

Mr. BARK: It has been stated that some plants have gone down sixty to eighty feet, although I have never dug down to see. (Laughter.) I have seen places, however, where the roots were twenty to thirty feet deep. I think, though, that six feet of the alfalfa roots are all that are doing much good.

Mr. CRANDALL: May I ask if you find clay is of sufficiently heavy substance to prevent penetration by the roots?

Mr. BARK: Not clay, but hardpan or impervious calcareous shale; but it would have to be very refractive clay to stop the growth of alfalfa. If the clay is porous so that the water can get in, the alfalfa will bore its way through very dense clay.

A DELEGATE: I would like to ask what you consider the minimum and maximum slopes for satisfactory irrigation.

Mr. BARK: I'd hate to have a field of mine slope more than one hundred feet to the mile, and the minimum slope should be something like five feet to the mile. You can irrigate, if nicely prepared, on a slope of five feet to the mile, but it takes a better level. One hundred feet to the mile for good big farms is enough. I saw hills this morning being irrigated that had probably five hundred feet to the mile (laughter) but you cannot farm a big alfalfa field and a big grain field in that way and be very successful, because it takes too much time to irrigate. You must be careful or you will wash the hill away.

Mr. KNIGHT: How would you arrange your supply of water if you had alfalfa in an orchard?

Mr. BARK: Well, I would prepare the ground much better if I was not putting in a cover crop, and I would never plant an orchard unless I could put in a cover crop, because you must do that to put nitrogen in and get a good yield. I would irrigate, I think, in the same way as other alfalfa fields. I think I would furrow it with corrugation furrows running right down with the tree rows.

Mr. KNIGHT: Would young trees get too much water then?

Mr. BARK: They would be liable too, but I would not keep the alfalfa in the orchard permanently. I would not put alfalfa in a single orchard; I would put in red clover, because you can kill that out easier, and it is hard in this country to kill out alfalfa. I saw one fellow who had tried to kill his patch and when I remarked that he had lots of alfalfa, he said? Don't talk about it. I am sick of it.' He had plowed it up in the fall and spring and in August he was grubbing it with a grubbing hoe. (Laughter.) The clover will do just as much good and is easier to kill out.

Mr. TAYLOR: You mentioned the matter of too much moisture in the fall, winter killing alfalfa. Is that not contrary to the usually accepted idea?

Mr. BARK: There is just a little leeway in that. I have seen alfalfa positively winter killed by being too dry. I like it rather moist, but you don't want to irrigate it and have it freeze up that day. The evaporation is low at that time of year and if it freezes up, it sometimes winter kills for that reason. Normally I would like a lot of moisture in the soil.

A DELEGATE: A speaker here said he put clover and alfalfa in as a cover crop. He did not cut it all and it required no more water. How do you find that?

Mr. BARK: Was he a big fellow. (Laughter.) I cannot see how that is going to live there without pumping some water. It will certainly take more water. Is he here now? (Laughter).

CHAIRMAN: If no other delegates have any questions to ask Mr. Bark, I will ask Mr. Conklin to make an announcement.

Reeve CONKLIN: Mr. President, ladies and gentlemen,—I wish to get an expression of opinion concerning the trip this afternoon. The gentleman in charge of the automobile ride this afternoon is anxious to know how many will partake of that ride, and so far as the Board of Control is concerned, we will be very glad to have every delegate and their friends here accept that ride, but our friends at Summerland are anxious to have you there, so it is a matter for you to decide. I would ask those going to kindly stand up. Thank you.

CHAIRMAN: I believe that Mr. Mutch has an announcement.

Mr. MUTCH: Mr. Chairman, I don't expect much attention after the very interesting discussion we have had, because all I have to say is that the committee in general charge ask me to announce that at nine o'clock this evening there will be a banquet tendered to the delegates from outside points. I don't like the term 'foreign delegates' but that has been used only, however, to distinguish delegates from outside points from those in Penticton. On leaving the hall this afternoon, Mr. Dynes and myself will be at the door and the formal admission invitation to this banquet will be furnished to the delegates by the Secretary.

CHAIRMAN: The Secretary announces that the standard certificates are ready and should be exchanged for tickets before night. The next item on our programme is an address by Mr. C. E. Whistler, Managing Editor, Fruit and Produce Distributor, Portland, entitled:

THE CARE AND CULTURE OF APPLES AND OTHER FRUITS.

Mr. WHISTLER: Mr. Chairman, ladies, gentlemen and cousins,—I have had the pleasure of a number of times addressing audiences through various parts of the western portion of the United States, but I may say this is the first time I have had the great pleasure of addressing an audience under the fostering care of two flags. (Applause). I am glad to see it such. It betokens a great deal, and this is certainly an auspicious moment for the display of a flag and the appreciation of what that flag means to every true hearted citizen. (Applause.) It is a time to-day when we are prone to talk a great deal about the question of patriotism and love and sentiment and wave aside as it were for the time being those things which really demand careful consideration. We hear a great deal of the man who says 'Under no consideration will I ever again go to war' and how I wish we all could carry it out. Now friends, there is a thing that is worse yet than going to war and that is existing in a state of living hell, and that is what prompts us and the heart of every true patriot to swell with pride at his native flag. I have little respect for any man whose heart does not swell with pride at his native flag, (applause) and I can fully realize how that flag is just as dear to you as this flag is to me, and I only appreciate you the more for it, because it shows in your heart a solidarity without which a nation amounts to nothing. Let us then have that feeling down in our hearts, not so much to do great things as to know that right must win. (Applause.) You people up here, of course, are much more interested over the present situation, perhaps, than we are, but with us it certainly is a very grave matter for the reason that all the world is getting badly mussed up and we don't know what the answer is. In fact, it brings to mind the suggestion contained in the story that when a certain John Oats married a lady named Lizzie Wheat, the band serenaded them with 'What shall the harvest be? (Laughter).

But I am here to talk peaceful measures, for none of us has yet been compelled to beat our pruning hooks into swords, and our avocations must go on, because without our agriculture industries, our other great industries must soon come to nothing and we might revert to barbarism, which I say is worse than war and I quote the words of Brutus 'Who among you is so base that he would be a slave?' and doubtless you answer 'None, Whistler, none.'

Now, my mission this afternoon is the biggest subject I have ever tackled in my life, if you will just notice all my subject—"The Care and Culture of Apples and other Fruits," (cultivation, insect pests, smudging, harvesting, packing, shipping, etc.)—and it kind of makes me wonder just what you think I am. It has been said that there are three requisites to every good sermon; first, the text; next, getting away from it; third, staying away from it; but if I were to stay away from my text, I could not very well talk about fruit at all. I do not know just what phase would interest you the most. I am mighty pleased to visit your section and I must pay a little tribute to the people up here for the industry they have shown. They have certainly harnessed the forces of nature and are making it serve them. Your conditions seem to me to be looking quite favourable for a profitable production and a happy life. I don't know when I

ever took a trip that enthused me more than the ride down the lake last Monday, and being met at every station by happy looking people. I don't know whether they were all dressed up to see us or what, but they were as nice a looking bunch of young people—boys, girls, women and men—as I ever saw, wherever I have driven. (Applause.) It was a pleasure and I am impressed with the idea that such a personnel as there is in this valley is going to win, however strong may be the current. I don't want, however, to raise your hopes unduly, because I am not a real estate man. They have done enough of that—they have done enough of that. I will tell you right now, friends, there are two potentialities at work to-day that are mitigating against your interests; the-get-rich-quick fellow and the man who is too lazy to work and do the best there is in him; that is lack of potentiality, but we have that all along the line. There is the man who has bought his orchard and paid a big price for it and hung a lot of bouquets on himself, and then curses the industry by losing his interest in it because it don't come back a hundred fold; and there is the other man, the man who has simply been taken in by believing stories and has become disgusted with it, and let it go.

Every horticulturalist has got to fight, but it is a fight of pleasure to the man whose heart is in it and whose only rewards are standing at the top. The man who wishes to be a horticulturalist must be built something along those lines. He must be something of a hunter, not to play sporty, but to take the bitter with the sweet and figure that when he makes something, he will make enough to cover some of those lean years, and he must have enough of other support to take care of him in those lean years. He is going to get lean years and he must fortify himself. He must be a philosopher, because there are some big rewards in the horticultural business, and I am not so pessimistic as those who believe that the zenith of this industry has passed; not by any means. It means more intensive work and rooting out that which is not of the highest quality. I have visited practically every fruit section west of the Rocky Mountains in the United States and I have found one condition; that the experimental stages have always been disastrous, but that they have got the answer in the long run. Too many valleys have been planted under adverse conditions and they have had to experiment to find out that type which was best adapted to the locality.

I will say this to you; I have never visited a fruit section in my life that was not more particularly adapted to some special line of fruit than to general lines of fruit. You may have a district that will grow some varieties of apples par excellence, and many other varieties, apparently similar, may be a failure. Some other section may utterly fall down on the same varieties and produce something else, and no one section have I ever seen that will produce all varieties to the highest state of development—never, never, never. That is naturally expensive to find out. You can take some sections where Newtown Pippins are pre-eminently the leaders and it would be almost useless to try Winesaps. That is a problem and if you have not yet solved that question here, you are not ready for high-class horticulture. You must solve that question, and I trust you are doing that.

Now, I have had experience in various lines of horticulture, beginning in Colorado in the peach business and someone asked me yesterday if I could tell you how a peach orchard was ever made to sell at $4,000 an acre. Many people

thought that all a myth. It is not. That is true, and it came just as naturally as the exploiting of your own valley. However, I did not sell that orchard at that price. I sold it when it was two years old and sold it on the 10th June for $1,060 cash money an acre, and when it was four years old it was sold for $4,000 an acre. How is it possible? Well, let me tell you, whenever you will have a series of high priced products for two or three years in succession, the people are going to go wild. That is one of our failures. They become too easily stampeded. We did have a year in peaches when we sold a carload of peaches in New York City for $2.05 a box. That brought the grower $2 a box. The same year we sold sixty carloads at $1.50 a box right on our station. Now, we had a bumper crop and when you begin to take 2,000 boxes of peaches off an acre at $1.50 a box,—Phew! get your lead pencil and figure out the value of that land, and then do something like that next year and it will drive the people just wild. There was $880,000 worth of land changed hands in a strip seven miles long and three miles wide from the 1st of January to the 1st April and there were only three pieces as big as forty acres. I had a small tract of six acres that I sold this man and I planted it out as perfectly as I knew how to and used the triangle in setting it. I had trimmed them all artistically and it was certainly pretty. Now, as I say, the people were simply going wild and that price was paid. However, the man that got it has gone broke, (laughter) and he is to-day working in a coal mine.

Now, I don't know whether you are interested in pear talk or not. Perhaps you are not heavily engaged in that. The problems of pear production are similar to those of apples. The planting is much the same and the cultivation is much the same, although it differs in different sections. We prune our pears very similar to what we do our apple trees. but I want to say something about pears and efficiency in preparation of your fruits for the market. I don't wish to boast. I don't admire the man who boasts about what he does. I don't know why any man should boast about being careful, but I sent a carload of pears down to New York City that sold for the highest price of any carload of Oregon pears, six and a half cents a piece for every pear in the car and there were 44,564 pears in the car, sold at auction. How did that come ? Well, there was a place that was willing to pay for merit, and a demand that can be reached any time. New York City and your big centres have always got the capital and the men who stand ready to invest in that which has the highest possible merit in it. I took great pains with that orchard, used intensive cultivation and went over it nineteen times. I used no alfalfa or cover crop and the ages of the trees were from eight to twenty years. The season was a most propitious one, very fine, and we put up thirty-two car loads. I took especial pains with that carload, wrapped them in half boxes. I was down in New York later on and found some of my pears in the market. I kept myself unknown to the dealer and asked if he had any Oregon pears. He said, "Yes, fine ones," and my brands were brought in. I said, "You call that good, do you ?" He said, "Yes, sir, the finest ever. I paid pretty high for those." "Do you make any money out of these ?" He said, "I never made as much money off a car of fruit in my life," and I was getting quite interested. (Laughter.) I said, "What class of trade do you find for them?" He replied "Here is an order for the Grand Plaza Hotel," an eleven million dollar hotel, and as near as I could find out, those fellows

paid fifty cents apiece for every pear they ate. (Laughter.) I said "My name is Whistler," and he said "I am glad to see you, glad to see you" and we had quite a little love feast. I said, "I am going to send a car down this fall that will bring more money still." He said, "How?" I replied, "I am going to put them up a little nicer," and he responded, "Well, I'm the man who's going to buy them." It is a question largely of préparation, but unfortunately I did not have the crop that season that I had the year before.

Now, that is simply to impress upon you the question of careful selection. When we first got the idea of putting up fancy package, the man who owned the orchards before me, took the precaution to put up fifty half boxes in plain wrapping paper, such as is seen in the ordinary package, and then he turned around and filled up the other fifty boxes with nice lace paper, packed them with printed wrappers around each pear and altogether put up a very fancy package. He sent them altogether and advised his dealer to note the effect on the market. All the difference between the two boxes was a matter of about nine cents and the work, and the fancy style brought one dollar a box more than the other. Since that time, we have followed out the practice of putting up the best stuff in a good package, and we still continue to do it, and still think it pays. I'll tell you fellows, the people in New York have the money and they don't want it like anybody else, and I am willing to do the work if they are willing to pay for it. (Laughter.) When the returns came back. I was speaking to the buyers of our company in town and said, "What do you suppose he has done with our pears to get such a fancy price?" A nice old Englishman listening nearby said "If you will allow me to interfere, perhaps I can tell you." I said it would be great information to me. He says, "Of course, I don't know, but it is my opinion that those pears have been purchased by a chef and have been placed in storage for the Manhattan Club, of which I am a member. We instructed our chef to buy the best. To belong, a man must have a millilon dollars, and I presume your pears are there." But I found out they were not there, although it gave me an idea.

It will be strange if you are not at times a bit apprehensive about the frost. I have noticed its effects in Colorado, Utah and Southern Oregon. There are many, many ways to combat the ravages of frost, from offering prayers that the Lord would protect the orchard, from that up to rubbing a substance on the north side of the tree. (Laughter.) An old man was incensed with me because I would not try it. He said that if I would just try it, I would be convinced—from that on up to various lines of smudging and heating. Smudging has several ideas in view, some to raise the heat and others to produce a smoke that will mitigate against the effects of the sun. For the purpose of producing a good smoke, manure and damp hay have often been used. We have produced some of the greatest smokes with oil, crude oil, and it will make such a smoke that it is hard to see. It has raised a question in my mind as to its effect upon pollenation. I would like to investigate this question because it is unsolved as yet, but it does this, according to the time when you are doing the smudging. If it should come on before the heavy blooming, I know that it does produce a dense covering over the pistils, which may effect pollenation. There is a point there. We have had a very heavy drop in this past season, even when we felt that the

temperature had been kept high. They thought I had done a perfect job, but later on the fruit dropped and evidently some of it was not pollenated. This season we used about 225,000 gallons of crude oil at an expense of five cents a gallon. In Bear Creek orchard alone, we burned 30,000 gallons of oil and the crop was not heavy. If smudging is done after pollenation has been effected, it cannot very well be injurious.

Coming to the question of apples, our district is one of Newtowns and Spitzenbergs. We pay little attention to anything else. The question of marketing, perhaps, is of interest, although there may be many others. I do not know just what your systems of marketing are, or that I would have very much to suggest if I knew. We are pretty well up in the air as yet in the States and our conditions are not just as I would like to see them. Now, I don't know how well you are organized, whether your systems are through packers, or consignment to commission men, or whether you have representatives at each of the large centres throughout the Northwest, whereby you can check your fruit and know the market. But I presume that you are still in a state of considerable chaos relative to that, and that is very vital, as Mr. Bark has said—a matter of vital importance. Now, complaints often come back on shipments of fruit, giving you a bad order on your fruit. It is very easy to write a bad order and knock off on account of fruit arriving in bad condition. Unless you have some line on your fruits, you are pretty apt to have that come in very frequently, but we are getting past that in the States, and if you have not passed it here, you have a nice lesson to learn in how to take care of your fruit. We have an agency in the States, and I am not telling secrets. It is far reaching and effective. It operates the Producers' Detective Association or Agency, wherein there is an agency operating in the producer's interest, and if a bad order comes into me and I have reason to think it is not bona fide, for $5 I can have any car of fruit examined, any place in the United States, and get an authentic report. It costs a small fee to become a member, but I know that a heavy percentage that used to come in, when they were run down, we found not to be bad orders at all. (Applause). We have sent men a number of times right to headquarters and dragged up the evidence, and they have come to us many times and been ready to give us a bonus. That is the way to do business with those fellows. Of course, I don't know the character of your fruit and it may be that your fruit arrives in bad order, but for every bad order you do send out, you get about four or five back. Maybe I am wrong. I hope your people are a hundred times more honest. (Laughter.)

Now, I have taken up more than my time and I don't know whether I have interested you. If you are not in touch with this last point, it is worth all the time you paid to listen to me. Maybe you have something that beats it. I hope you have, but it is a matter of prime importance. Now, I'd like to have some questions. (Applause.)

Mr. KNIGHT: I would like to ask a question in connection with the Sunkist oranges. I understand that Association is trying to increase the demand because of the extraordinary increase in production, and that they are trying to get persons to use oranges every day of the week. Is that a regular method, and is it feasible to apply it to apples?

Mr. WHISTLER: That has some high virtue. There is a great deal of that done and they have extended their orange trade. One method was to put a premium in each box, a silver spoon, which greatly helped to stimulate the demand. Then, they had the doctors advise that oranges were good for the health, all such work as that, and they have increassed largely the consumption of oranges. I think it might be a good idea to do it here with apples, because I think they are very good for the consumer. They are healthy and could be well advertised on those particular grounds.

Mr. BULMAN: Do you know if that agency you speak of operates in Canada?

Mr. WHISTLER: I think not. It is known as the Produce Reporters' Agency. I do not think it operates across the line.

Mr. WINSLOW: No, they don't.

Mr. TAYLOR: Could you tell us at what age Newtowns start bearing?

Mr. WHISTLER: I have often been asked what age these come into bearing, but there is much in connection with conditions. I must know that before I can answer the question. It is like asking when will a boy learn to swim? In the Hood River district, a man will say seven to eight years old, but elsewhere the time may be ten to twelve before the crop is considerable.

Hon. PRICE ELLISON: What success have you had with co-operative principles and general selling agencies?

Mr. WHISTLER: It depends a whole lot on the men. Some will say one thing and some another. We have had various experiences. As a whole, I think they have been quite profitable. I believe in organization. I cannot help feeling that the individual is but a ship on a rocky billow. It has not all been a success, although a great advancement has been made. It is a slow process. In California when they organized the citrus union, it took many years before they were able to perfect the organization. They had to get sixty per cent of all the product before the organization ever amounted to much. Until they did, they could only follow the price set by the predominating amount of stock offered, but when they got the sixty per cent, the other fellows had to come under their umbrella, and it was quite comfortable.

Mr. SMITH: Allow me to supplement that answer with this statement. First, those sections where they have had the best organizations have been able to sell their product at the best prices, at prices twenty-five to thirty-three and a third per cent higher. Next, every time we get into difficulties with some method of organizing, we learn by experience and are able to avoid the same mistake a second time. Our system is getting a little more widespread, safer and better and just a little more satisfactory year by year, and we are thoroughly convinced that the future of the fruit industry depends upon the extent and character of the co-operative organizations. (Applause.)

Mr. JOHNSTONE: I would like to ask if it is necessary to employ more than the wholesalers in selling fruit; if it is necessary to pay the jobber's price ?

Mr. WHISTLER: We have them in the United States and do the same. No, it is not necessary, but you must have a very thorough working organization to meet that proposition. Of course, if you have a few carload lots of your own you might be able to avoid the jobber, but he will give you an awful run for your money. Now, I am a commission man or a jobber, that is for instance (I am not, thank the Lord) (Laughter), and I am handling your fruit and I know that another man is going into a certain market that I wish him to keep out of, I take your fruit and meet him down there and break that market, and I have not lost anything and broke him, and you paid the expenses. (Laughter.)

Mr. JOHNSTONE: You believe that with a good organization you could do without the jobber ?

Mr. WHISTLER: Yes, sir.

Mr. JOHNSTONE: Thank you.

Mr. WHISTLER: What I mean is, you have your own jobber, that is what you really come to. You do not need to retail here and there.

Mr. JOHNSTONE: Exactly.

A DELEGATE: Have you any special method of inducing fruit growers to join the organization ?

Mr. WHISTLER: Just by letting them know that they are losing money by standing out, that is all you can do. Just present the facts and show them that they are standing in each other's way by not co-operating. That is the only thing I know of, to induce a man to come to his own rescue.

A DELEGATE: I ask that question because I understand, I believe, we have several of our leading fruit growers in this district who are not in the organization.

Mr. WHISTLER: Well you cannot force a man. All you can do is to show that you are able to perfect an organization that has a better working principle, that will beat his, perhaps. (Hear, hear.) Experience will prove the best teacher.

Mr. SMITH: Another thing we have to combat among the confounded Yankees; there are men so thoroughly dishonest that they cannot get into the co-operative association because they do not believe there are any honest men anywhere in the country.

Mr. CONKLIN: At what particular stage of the bud or blossom is the greatest liability to frost, or when do you smoke ?

Mr. WHISTLER: When the weather gets threatening. If the weather is not threatening, we would not smoke, but the greatest danger period is right at the pollenating period which lasts, owing to climatic conditions and the variety of fruits, from four days to seven days. That is the vital period.

Mr. A. H. HUNTLEY: I would like to ask Mr. Whistler if he could kindly help us on co-operation. As already intimated, gentlemen we greatly respect have built up a large trade dealing directly with retailers for a number of years before we commenced co-operation. They have come in and fallen out. How could we get them to believe it is really the best thing? They are not very far from you this afternoon and I for one am very anxious to have them know that co-operation is the best step they can take. If you can convince them, you will be doing a great deal for Penticton, Mr. Whistler. (Laughter.)

Mr. WHISTLER: I certainly recognize the situation fully, but in a time of war, treaties do not amount to much. Those men probably came in on some certain agreement. Alright, they may have seen an opportunity to make more by jumping out and the dollars were too big and they did so, not fully realizing that if all did the same it would kill their goose for them. The idea is to get together and all live and get down together and secure what that old flag there represents—solidarity. (Applause.) A man must understand that he has got to live and fall with his neighbours. (Hear, hear.)

CHAIRMAN: Mr. P. H. Eraut, Chairman of Municipal Irrigation, Penticton, is going to tell us something about the system which we are going to visit.

MUNICIPALLY CONTROLLED IRRIGATION.

Mr. P. H. ERAUT: Mr. Chairman, ladies and gentlemen,—I will endeavour to give you a short description of our municipally owned irrigation system and the manner in which it is operated by us. It is one of two systems owned and operated by a municipality in British Columbia. It was thought by a number of people, at the time it was purchased from the Southern Okanagan Land Company in 1910, that it could not be operated by the municipality to the satisfaction of the users and continue to be self-supporting. Time has proved the contrary, the system paying its way almost from the time of its purchase from the land company. Penticton's irrigation system was installed about nine years ago by the Southern Okanagan Land Company, to irrigate their tract of some 5,200 acres. The cost of the system to the municipality was $90,000, the money being raised by the issue of debentures bearing five per cent interest, which the company took over at par in payment for the system. The system itself comprises two units, situated on Penticton and Ellis creeks. There is a dam on each creek about two miles up from the town, at an elevation of 425 feet above the level of Okanagan lake, where the head-gates are situated. The capacity of the Penticton gate is 800 miner's inches, and the Ellis gate, 1,035. There are, altogether, thirty-five miles of flume, 10½ miles of open ditch and five miles of pipe, which extends four miles north and four miles south of the town and about

two miles in width. The water is delivered to the highest point of the user's land. Measuring boxes, as used by the most private corporations, are unknown, the user obtaining all the water he wants and when he wants it. We have not, up to the present time, known what it is to be short of water, although apart from the irrigation we supply domestic water for a population of about 3,000, also an electric light plant, a cannery and the Kettle Valley roundhouse. Our reservoirs are situated as follows: One on Penticton creek and two on Ellis creek, with an additional two sites on the latter creek. Penticton creek reservoir is situated about 18 miles up the creek at an elevation of 5,280 feet, its capacity being 185,000,000 gallons; should occasion arise, it can be enlarged to hold a total of 700,000,000 gallons. Ellis creek reservoirs are situated about fourteen miles up the creek at an elevation of about 4,800 and 5,400 feet respectively, above sea level. Their combined capacity is 115,000,000 gallons. The watershed is about 180 square miles and the northern slopes being heavily timbered, retard melting of the snow till late in June. The usual time when it is found necessary to draw on the reservoirs is from July 18 to August 5, according to the season. Repair and replacement work, including caulking of flumes and other necessary details, is commenced about the 1st of March each year. This work usually lasts a month. The policy of the council, when removing old flumes, is to replace, wherever possible, with iron pipe or work of a permanent nature. Water is turned on the 1st of April, although the irrigation season proper does not commence until May 1. During this month, the first irrigation work is begun. Some of the patrons of the system leave their initial irrigation work until June, while others, who only irrigate once a year, turn on the water in July. The irrigationists usually require from four to six days (of twenty-four hours each) at each irrigation period, during which time the water flows continuously. It is customary in this locality to give two such waterings. A greal deal, however, depends on the nature of the soil and the cultivation it receives. Very little work of this nature is done in August, as it tends to prolong the growing season too long, endangering the new wood on the fruit trees not yet hardened to stand the winter. On August 31, the irrigation season proper terminates, though water is left running in the flumes for accommodation of those desiring it for domestic purposes. This is continued until November 15, when the flumes are drained and the plant closed down until the following spring. The rates charged per annum to users of irrigation water is $3.25 per acre. This rate covers sinking fund, interest, management and upkeep. In the operation and care of the system, two men are employed for six to eight months respectively, and one man to care for reservoirs during flood season, at a wage of $125 a month and provide his own horse. The duties of the two men comprise inspection of the entire system under their charge every day, regulating the quantity of water in flumes, detection and repair of leaks and damage, supplying consumers with water when required and reporting regularly to the Chairman of the Irrigation Committee. For a time it took a considerable amount of trouble and patience to educate the water users to the fact that they must not molest or tamper with their own or any other water gate. They were under the impression that, it being a municipally-owned system,

they could use the water at their own convenience. This would have entirely disorganized the system, rendering the water supply erratic and no end of difficulty and trouble entailed. Everything, however, is now running smoothly and the purchase of the irrigation system by the municipality is admitted by all to have been one of the best achievements of the municipality since the incorporation of Penticton in 1909. In operating the system the council appointed a committee from themselves and they in turn appoint a chairman who is responsible for the proper management of the system. The chairmanship of the irrigation committee is no sinecure and is quite an honorary office. In the new B.C. Water Act, there are several advantages to a municipally-owned system, viz., representatives are elected for a term of years who are users of the water, whereas in a municipally-owned system, the members are elected each year, and members representing town wards have no knowledge of irrigation, thus the system is liable to suffer by change of policy or lack of knowledge. Penticton has been fortunate so far in having its system controlled by the same head for the last four years. (Applause.)

Mr. CRANDALL: In riding over the irrigation system, we find in many places the pipe runs under the track. How do you take care of the water when the frost comes in the fall ?

Mr. ERAUT: We often tap and let the water out under the crossings, but the Kettle Valley people take entire charge of that. We have nothing whatever to do on their right of way. They are responsible if anything should happen.

Mr. CRANDALL: How late do you turn if off, and how early in the spring do you turn it on ?

Mr. ERAUT: We start construction the 1st of March and keep it up for a month and the water is turned on the 1st of April and continues until the 15th or 20th November and probably into December.

CHAIRMAN: We will now hear the final report of the Committee on Resolutions.

Mr. PEARCE: Mr. President, and members of the Eighth Annual Convention of the Western Canada Irrigation Association: The Committee on Resolutions has striven to keep in view the chief aim of the Association and believes that object can best be attained by passing on to it those resolutions only which relate strictly to the purposes of the Association or in which those purposes largely predominate; preferring to leave alone local association matters or those outside of the main object of this Association. To determine where to draw the line is difficult, particularly as one's sympathies are aroused at first by what appear to be grievances. Many of these, however, may be, on investigation relieved by reference to the law as it at present exists, or by some slight amendment thereto.

By such action, we hope to contribute our small quota towards checking the insane mania at present existing that most, if not all, of our ills or wrongs, can be cured or mended by legislation.

Therefore, we beg to report:

Resolution Number One does not come within the proper scope of this Convention.

At the same time, if the representations made regarding the practical working out of the Railway Act, so far as it affects the expropriation of land for the railway, or the assessment of damages arising out of the construction and operation of the same be correct, it would appear that some changes might with advantage be made, so as to expedite an equitable settlement. We therefore beg to refer this phase of the matter to the attention of the legislature, which alone can deal therewith.

Resolution Number Two. Your committee cannot see its way clear to approve the crux of this, viz., ownership by any individual of trees planted on a public highway. We would, however, commend both to the Provincial Government and that of the Municipality, that it is particularly desirable that every encouragement should be given to the planting on such highways of trees, shrubs and flowers, both for shade and ornamental purposes.

Resolution Number Three. The mover and seconder have withdrawn this, believing that the Water Act of the province grants ample protection in this matter.

Resolution Number Four. As to this resolution, the mover and seconder have withdrawn it, and desire us to substitute the following resolution therefor, and which this committee endorses.

Whereas it is acknowledged that the so-called dry belts of British Columbia are among the most important fruit-growing centres of Western Canada; and

Whereas the development of these districts along horticultural and agricultural lines to the maximum area profitable and at the earliest date is essential; and

Whereas this development depends on an adequate supply of water for irrigation purposes;

Be it resolved that it is in the public interest that investigations be carried on as speedily as possible, with a view to the Government eventually considering the policy of constructing dams and storage reservoirs, if it is found by such investigations that there is sufficient land reclaimable, as will justify the work, and produce a revenue that will in the course of a reasonable time return the cost of construction and maintenance.

Mr. PEARCE: I will move, seconded by Dr. Dickson the adoption of this report of the Committee on Resolutions.

CHAIRMAN: You have heard the report and its adoption has been moved and seconded. What are your wishes? Carried.

Mr. PEARCE: There is another resolution handed in, which I will read.

Moved by R. C. Regler, seconded by Charles McCordy:

Whereas the thanks of this Association are due to the Dominion Government of Canada and to the Provincial Governments of British Columbia and Alberta for their financial assistance and hearty encouragement; and

Whereas consideration was given to the thought of abandoning the meeting of the Association for the present year, owing to the present troublous times; and;

Whereas the above-mentioned governments coincide with the opinion of the Executive of this Association relative to the holding of the International Irrigation Congress at Calgary, October 5 to 9, 1914, and with the view that anything calculated to be a help to agriculture would be a help not only to Canada but to the Mother Country;

Therefore the Western Canada Irrigation Association in convention assembled, takes this opportunity to assure the Dominion and Provincial Governments of its unswerving loyalty to the Mother Country and also to assure them that it considers no sacrifice too great to make to keep the British Empire intact.

(Loud applause.)

CHAIRMAN: Evidently it is the wish of the Convention that the last resolution be embodied with the report as adopted.

Moved by Mr. Huckvale, seconded by Mr. Pearce:

That this Association, in convention assembled, desire to express their appreciation and to extend their heartiest thanks to the Reeve and Council, the Board of Trade, the President and officers of the Aquatic Club and the people generally of Penticton for their unbounded hospitality and kindness, and last but not least, to Mr. J. J. Warren, President of the Kettle Valley Railroad, for his kindness and in placing a train at their disposal and showing them the wonderful engineering feats and scenic beauties of his road. Carried.

CHAIRMAN: That will also be embodied in the report.

Mr. CONKLIN: Mr. President, ladies and gentlemen, on behalf of the Muncipality and the committee as a whole, I assure you it has only been a

pleasure to take the steps we have and I sincerely hope that you have all enjoyed and appreciated our efforts.

CHAIRMAN: Mr. Reeve, I am truly sorry that the chairman is not an orator and equal to the occasion so that I might tell you how much we have all appreciated your hospitality.

Mr CRANDALL: It seems to me at this time, when bouquets are in season and being flung to those who have done so much towards the success of our meeting that a word would not be out of place calling the attention to the great labour and success which have been put forth by Mr. Rankin and his able assistants. (Applause.) I don't think there is one person realizes the amount of labour entailed upon these gentlemen and the great industry and good judgment used by them to make this Convention a great success. I feel each one of us owes them a debt of gratitude and I think expression should be given thereto for their loyalty to their work. (Applause.)

CHAIRMAN: I trust the official reporter gets this last little speech down.

A DELEGATE: I believe that the last resolution offering thanks to Penticton ought to be amended to include Summerland for the kindly efforts which they put forth,

CHAIRMAN: It seems to me this is a good suggestion and if there is no objection, the chair will see that it is inserted. (Applause.) I believe that Mr. Rankin wishes to bring up one point

Mr RANKIN: I wish to say that I have received the following letter from Mr. J. Robert Brown, Indian Agent at Vernon, B.C., dated July 16th, 1914:

DEAR SIR,—

Replying to your circular letter enclosing form of certificate of appointment of delegates, I beg to say that as there is apparently no provision made for Indian Agents being appointed as delegates, I am unable (much as I would like) to be present at the forthcoming convention to be held in Penticton, as a delegate. I attended the conventions held in Kamloops and Kelowna and was deeply interested, not only on my own account, but also on account of my wards, but I think some provision ought to be made so that Indian Agents can attend the conventions of the Association as delegates.

Yours respectfully,

J. ROBERT BROWN.

I replied to this as follows, under date of July 21st:

DEAR MR. BROWN,—

I have your letter of the 16th instant and sincerely regret to note that our basis of representation makes no special mention of an Indian Agent, but you would come in under the heading of "Foreign Delegates" and I write this special letter on behalf of the Executive to invite you to be present as such. If you will please fill out the memorandum half of the Certificate of Appointment and return it to me, retaining the other half, which you should bring with you to Penticton, the matter can be brought up as an amendment, so that hereafter provision can be made for the Indian Office.

Please accept my compliments, and assuring you that I look forward with great pleasure to seeing you at Penticton, I remain

Yours very truly,

NORMAN S. RANKIN.

I may say that Article X of our Constitution says: "The Constitution may be amended by a two-thirds vote of the delegates present at any annual convention, provided notice of the proposed amendments shall be mailed to the Secretary at least one month prior to the Convention, and that notice of such amendments shall be incorporated in the official call."

I received this letter one month before but I was delinquent in not bringing the matter to your attention through the Official Call. If it is the wish of the gathering, it would require a two-thirds vote to make it right, and I would also suggest that members of the Dominion Water Power Branch be included.

CHAIRMAN: What are your wishes? Shall we amend the Constitution so that the gentlemen mentioned shall have a chance to be represented as delegates?

Moved by Mr. Johnston, Kamloops, seconded by Mr. Pegler, Bassano, that the Constitution be amended accordingly so as to include Indian Inspectors and Agents from Saskatchewan, Alberta and British Columbia, the Superintendent of the Dominion Water Power Branch of the Department of the Interior and one representative from the Water Power Branch; one from the British Columbia Hydrographic Survey and one from the Manitoba Hydrographic Survey. Carried.

CHAIRMAN: The next item on the programme will be the election of officers for the forthcoming year. The following officers were then elected:—

Hon. President—The Honourable Dr. Roche, the Minister of the Interior.

President—The Honourable Duncan Marshall, the Minister of Agriculture for the Province of Alberta.

Vice-President—Dr. C. W. Dickson, Kelowna, B.C.

Second Vice-President—William Pearce, Calgary, Alberta, and Chairman Executive Committee.

Executive:

R. C. Pegler, Bassano, Alta.
F. H. Peters, Calgary, Alta.
W. Huckvale, Medicine Hat, Alta.
W. H. Fairfield, Lethbridge, Alta.
James Johnston, Nelson, B.C.
William Young, Victoria, B.C.
Arthur Chamberlain, Kamloops, B.C.
J. C. Dufresne, Penticton, B.C.
Permanent Secretary, Norman S. Rankin, Calgary, Alberta.

CHAIRMAN: The next order of business is the selection of a place of meeting for the Convention in 1915.

PLACE OF MEETING.

As the result of representations then made by the delegates, it was moved by Mr. Dufresne and seconded by Mr. Huckvale, that the Ninth Annual Convention of the Western Canada Irrigation be held at Bassano in 1915. Carried.

Representatices from Kamloops and Medicine Hat also announced that their districts would bid for the annual convention in 1916 and 1917 respectively.

Mr. WHISTLER: Gentlemen, I know you are anxious to withdraw but there is something in my heart that must come out before we adjourn this splendid meeting. For me to say I have enjoyed myself does not really express the feeling within my heart. I certainly have enjoyed the pleasure of this experience, of the intercourse and exchange of ideas, and I appreciate fully the interest you are taking in the great problems of life. Now, then, I am President of the Oregon State Horticultural Society. We meet in the month of December and I want to extend to you the kindest invitation to come down and hear us and help us, and we will endeavour to make you feel as I have felt here. (Applause.)

Mr. HUCKVALE: I would like to express on my own behalf and, I take it for granted, of this Convention, our great regret that Mr. J. S. Dennis has not been able to be present. He has probably done more to further the success of this Association than any other single man in the country. (Hear, hear.)

I am sure his absence has been entirely unavoidable this time and I would like, Mr Chairman, if you would allow the placing on the minutes of this meeting the regret of this Convention at his absence this year. (Applause.)

CHAIRMAN: I am sure we all cordially endorse what Mr Huckvale has said. No one has worked harder or helped more in our Association, or for irrigation, perhaps, than Mr. Dennis.

Mr. PEARCE: I would like to include in that the Hon. Mr. Ross.

CHAIRMAN: The expressions shall be entered on the record accordingly.

Motion for adjournment is now in order.

Moved by Mr. Pearce, seconded by Mr. Dufresne, that the Convention now adjourn. Carried.

A meeting of the new Executive was held in the Incola hotel, Penticton, B.C., August 19, 1914, at 9 p.m., Mr. Peters being the only absentee.

Mr. Pearce was elected to the chair, and the reading of the minutes of the previous executive meeting was dispensed with.

Moved by Mr. Pegler, seconded by Mr. Huckvale, that a meeting of the Executive be held at Banff sometime in December next, at the call of the Permanent Secretary. Carried.

Moved by Mr. Fairfield, seconded by Dr. Dickson, that Messrs Marshall and Peters, and Messrs. Ross or Young and the Secretary, be appointed a delegation to attend the next meeting of the Oregon Irrigation Congress at Portland. Carried.

Moved by Mr Huckvale, seconded by Mr. Chamberlain, that the Executive attend the meeting of the International Irrigation Congress to be held at Calgary in October, 1914. Carried.

The meeting then adjourned.

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DEPARTMENT OF THE INTERIOR
IRRIGATION BRANCH

REPORT OF THE PROCEEDINGS OF THE NINTH ANNUAL CONVENTION OF THE WESTERN CANADA IRRIGATION ASSOCIATION

HELD AT
BASSANO, ALBERTA
November 23, 24 and 25, 1915

Published by the authority of the Hon. W. J. Roche
Minister of the Interior

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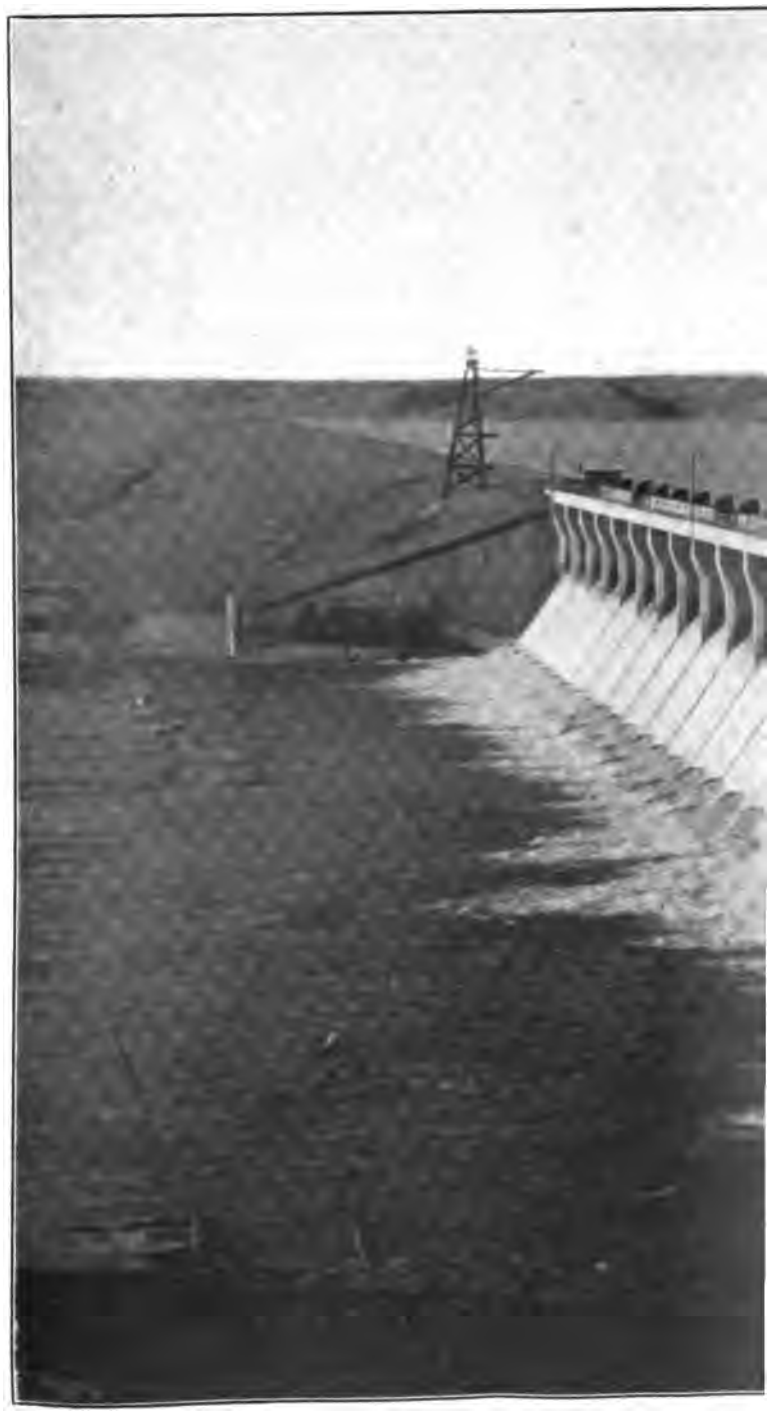

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Calgary, Alberta, 1911.

Kelowna, British Columbia, 1912.

Lethbridge, Alberta, 1913.

Penticton, British Columbia, 1914.

Hon. W. J. Roche, Minister of the Interior
Honorary President Western Canada Irrigation Association

Hon. A. L. Sifton
Premier of Alberta
Hon. W. R. Ross
Minister of Lands, B.C.
Hon. Duncan Marshall
Minister of Agriculture, Alberta.
G. A. Marnock
President of the Board of Trade, Lethbridge
W. H. Fairfield
Supt. Dominion Experimental Farm, Lethbridge
Dr. J. G. Rutherford
Supt. of Agriculture & Animal Industry, C.P.R.

THE WESTERN CANADA IRRIGATION ASSOCIATION

OFFICERS FOR THE YEAR 1914-1915.

Honorary President—The Honourable W. J. ROCHE, Minister of the Interior.
President—The Honourable DUNCAN MARSHALL, Minister of Agriculture for the Province of Alberta.
Vice-President—DR. C. W. DICKSON, Kelowna, B.C.
Second Vice-President and Chairman Executive Committee—WILLIAM PEARCE, Calgary, Alberta.

EXECUTIVE COMMITTEE

R. C. PEGLER, Bassano, Alberta.
F. H. PETERS, Calgary, Alberta.
W. HUCKVALE, Medicine Hat.
W. H. FAIRFIELD, Lethbridge.
JAS. JOHNSON, Nelson, B.C.
WILLIAM YOUNG, Victoria, B.C.
ARTHUR CHAMBERLAIN, Kamloops, B. C. (Enlisted Aug., 1915). C. E. LAWRENCE.
J. C. DUFRESNE, Penticton, B.C. (Enlisted early spring). MAURICE SMITH.
Permanent Secretary—NORMAN S. RANKIN, Calgary, Alberta.

LOCAL BOARD OF CONTROL.

Chairman—J. S. MAVOR.
Vice-Chairman—H. SMITH.
Secretary—R. A. TRAVIS.
G. W. BOYD, O. DAEHLER, W. FLANAGAN, G. M. PEARCE, B. T. GRAY, P. W. STONE.

PROMPTNESS.

The essence of success in all meetings, excursions and lectures is promptness, and as the time is limited it is the desire of the executive that every delegate make the best of it.

RULES.

Rules governing the conduct of the Convention will be read by the Secretary from the constitution prior to the opening address. They will be found on the inside back cover. Strict compliance with these will expedite business.

SECRETARY'S OFFICE.

The permanent Secretary's headquarters are at the Berkeley Hotel.

REGISTRATION.

Delegates are requested to register with the permanent Secretary or his assistant on arrival or at Padden's Hall during convention hours.

RAILWAY CERTIFICATES.

Holders of standard railway certificates will present them to the Secretary or his assistant at his office in the Berkeley Hotel or at Padden's Hall during convention hours.

BADGES.

The Secretary will issue a badge to each delegate upon registering, and it should be worn conspicuously during the Convention to enable the Chairman to recognize properly accredited delegates. An additional badge of a distinguishing colour will also be worn by each executive.

ADMISSION.

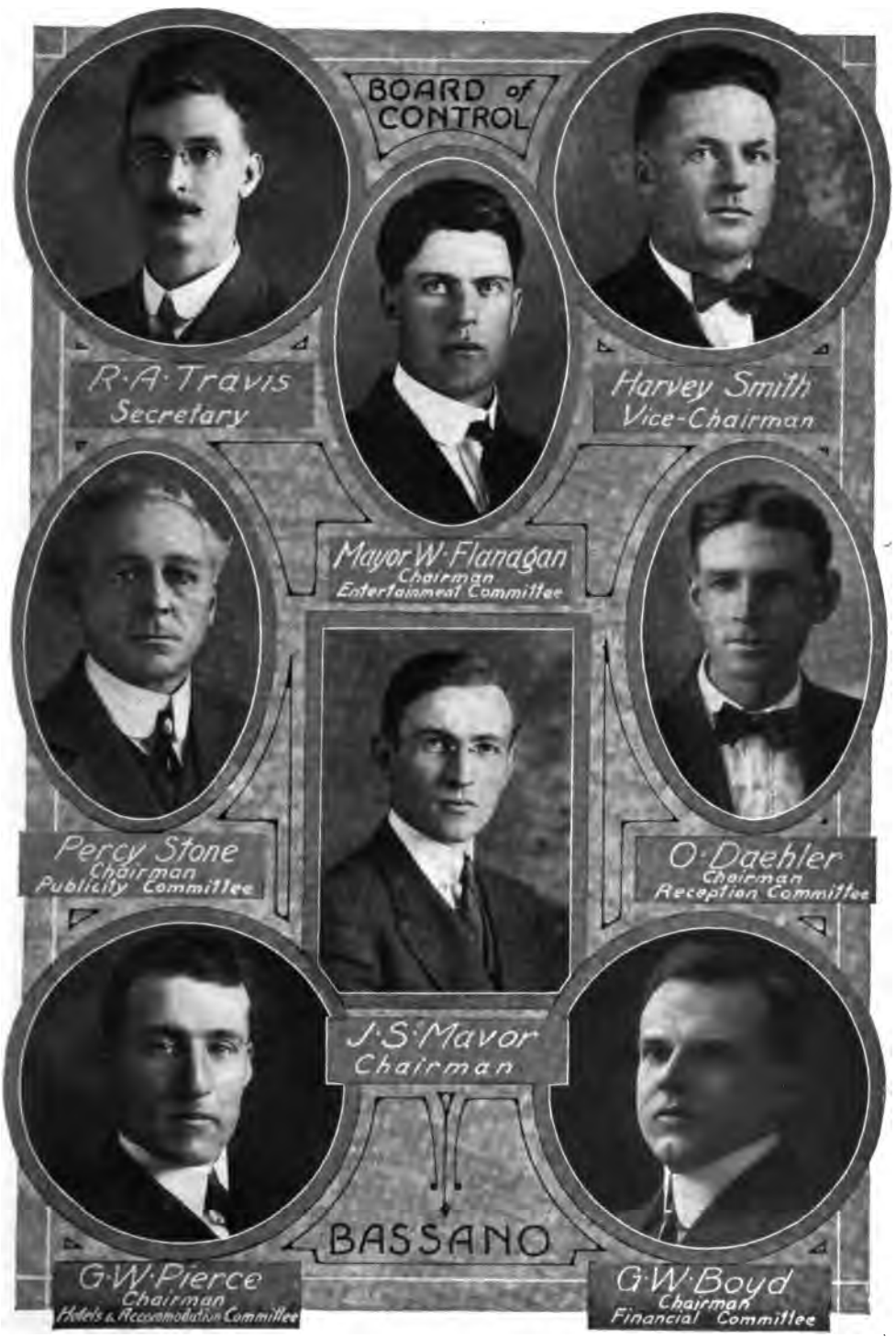
There will be no charge for admission to any session of the Convention, and the public are cordially invited to attend. Farmers are especially invited to all sessions and to participate in the discussions.

The Story of Irrigation By

THE WESTERN CANADA IRRIGATION ASSOCIATION

QUESTION:	*ANSWER:*
What is the source of all wealth?	Land.
What produces the wealth?	Labour.
Who furnishes the labour?	The Farmer.
What natural agencies does the land require?	Sunshine and water.
How is water supplied?	Rain, snow or Irrigation.
Which is best?	Irrigation.
Why is Irrigation best?	Because it is always available.
What is its effect?	Increases production.
What does increased production do?	Increases prosperity.
What does increased prosperity do?	Increases settlement.
What does increased settlement do?	Improves social conditions.
What will improved social conditions do?	Make better people.
What comes with better people?	Better home conditions.
What is the foundation of the Empire?	The Home.

IRRIGATION Advances Agriculture, Produces Prosperity, Inculcates Industry Promotes Patriotism, Saves the Soil and Provides for Posterity.


BOARD of CONTROL
R·A·Travis
Secretary
Harvey Smith
Vice-Chairman
Mayor W·Flanagan
Chairman
Entertainment Committee
Percy Stone
Chairman
Publicity Committee
O·Daehler
Chairman
Reception Committee
J·S·Mavor
Chairman
BASSANO
G·W·Pierce
Chairman
Hotels & Accommodation Committee
G·W·Boyd
Chairman
Financial Committee

THE WESTERN CANADA IRRIGATION ASSOCIATION CONVENTION

Bassano, Alberta

TUESDAY, NOVEMBER 23rd

PROGRAMME

OPENING SESSION 9.30 a.m.

9.30—The meeting will assemble in Padden's Hall. Delegates will arise and led by the orchestra, join in singing "God Save the King."
Call to Order. The Honourable Duncan Marshall, President of the Association will call the meeting to order, and declare the Ninth Annual Convention formally opened.

9.45—Welcome to the Province, Honourable A. L. Sifton, Premier of Alberta.

10.00—Welcome to the town, His Worship, Mayor Flanagan.

10.10—Introduction of J. S. Mavor, Chairman, Local Board of Control.

10.20—President's Address, The Honourable Duncan Marshall.

10.40—Secretary's Report, Norman S. Rankin.

10.50—Address, Honourable W. R. Ross, Minister of Lands, B. C.

11.10—Address, Honourable W. A. Motherwell, Minister of Agriculture, Saskatchewan, or Representative.

11.25—Address, J. S. Dennis, Vice-President, International Irrigation Congress.

11.45—Address, E. F. Drake, Superintendent of Irrigation, Ottawa.

12.00—Address, T. A. Hargrave, President, Cypress Hills Water Users' Association, Maple Creek, Sask.

12.10—Appointment of Committees on Credentials and Resolutions.
Adjournment to Exposition Hall. Official opening of Soil Products Exposition.

AFTERNOON SESSION

2.00—Address, James Speakman, President United Farmers of Alberta. Discussion.

2.45—I. D. O'Donnell, Supervisor of Irrigation ,U.S. Reclamation Service, Billings, Montana, "Better Farming." Discussion.

3.30—E. A. Howes, Dean Faculty of Agriculture, Alberta University, Edmonton, "Agricultural Education in Alberta."

4.10—Dr. J. G. Rutherford, C. M. G., Superintendent Agriculture and Animal Husbandry, C. P. R., "Livestock on the Irrigated Farm." Discussion. Adjournment.

EVENING SESSION.

8.00—Marjorie M. Goldie, Instructor in Household Science, Alberta Government, Olds, "Advantage of Household Science Training for Country Girls."

9.00—S. S. Dunham, Vice-President United Farmers of Alberta, Lethbridge, "The Future of Irrigation in Southern Alberta."

Following the Address of Welcome to the Province on the above day, His Honour Lieutenant-Governor Dr. Brett will give an Address of Welcome to the Foreign Delegates.

WEDNESDAY, NOVEMBER 24.

MORNING—ALFALFA SESSION.

9.30—Don H. Bark, formerly in charge of U. S. Irrigation Investigations in Idaho. Discussion. "The Growing of Alfalfa."

10.15—"Alfalfa, the Basis of Successful Irrigation Farming." S. G. Porter, Irrigation Branch, Department of the Interior, Calgary. Discussion.

11.00—"Crop Rotations on Irrigated Land," W. H. Fairfield, Superintendent Dominion Experimental Farm, Lethbridge. Discussion.

11.45—"The Alfalfa Farmer," (Covering the adaptability of soils, planting, cultivating, irrigating, harvesting, food values, as a factor in home building, etc.,) Jos. T. Hinkle, Vice-President International Irrigation Congress, Hermiston, Oregon. Discussion.

12.30—Preliminary Reports: Committee on Credentials. Committee on Resolutions. Adjournment.

AFTERNOON SESSION.

2.30—There will be no afternoon meeting. Instead, Delegates will assemble at Convention Headquarters where automobiles or teams will be taken for a visit to the Bassano Dam, Crawling Valley Dam, and other points of interest in the vicinity.

EVENING SESSION.

8.00—G. H. Hutton, Superintendent Dominion Experimental Farm, Lacombe, "Grading up a Dairy Herd." Discussion.

9.00—R. M. Winslow, Secretary B. C. Fruit Growers' Association, "Getting B. C. Fruit to the Prairie Farmer." Discussion.

THURSDAY, NOVEMBER 25.

MORNING SESSION.

9.30—William Young, Controller of Water Rights, Department of Lands, British Columbia, "The Success of Water Users' Communities in B. C." Discussion.

10.15—"Practical Irrigation," Don H. Bark, formerly in charge of U. S. Irrigation Investigations in Idaho. Discussion.

11.00—D. J. Wylie, Honourable President Cypress Hills Water Users' Association, Maple Creek, "Livestock." Discussion.

11.45—G. R. Marnoch, President Lethbridge Board of Trade, Address.

12.15—Final Report, Committee on Resolutions. Adjournment.

AFTERNOON SESSION.

2.00—W. E. Scott, Deputy Minister of Agriculture, British Columbia, "Agricultural Opportunities in British Columbia." Discussion.

2.45—G. D. Walters, Irrigation Branch, Department of the Interior, "Field Irrigation Investigation by the Irrigation Branch, Department of the Interior." Discussion.

3.30—Address, D. W. Hayes, Chief Engineer, Southern Alberta Land Co., "Cost Accounting for Farmers."

4.15—Final Report, Committee on Resolutions Election of Officers and Selection of next place of meeting.

EVENING.

8.30—Reception Banquet to Delegates, Officers and Speakers, tendered by the Local Board of Control.

Announcement of Judges of winners of Premiums in the Soil Products Exposition.

Hon W A Motherwell
Saskatchewan
S G Porter
Asst Chief Engineer
Irrigation Branch, Dept of the Interior
G H Hutton
Supt Dom. Exper. Farm
Lacombe, Alberta.
Miss M M Goldie
Instructor in Household Science
Provincial Agricultural School Olds Alta
J S Dennis
Asst. to the President
of the C.P.R.
Don H Bark
Formerly in charge of US Irrigation
investigations in Idaho
James Speakman
President United Farmers of Alberta
Calgary (Since deceased)
S S Dunham
Vice-President United Farmers
of Alberta, Lethbridge.

E. F. Drake
Supt. of Irrigation,
Dept. of the Interior
Wm. Pearce
Retiring Chairman
Executive Committee W.C.I.A.
E. A. Howes
Dean, Faculty of Agriculture
University of Alberta, Edmonton
William Young
Controller of Water Rights B.C.
F. M. Smith
One of the B.C. Executives
of the W.C.I.A.
F. H. Peters
Commissioner of Irrigation,
Dept. of the Interior
Norman S. Rankin
Secretary W.C.I. Association

CONVENTION RULES

Each morning session shall be called to order at 9.30 a.m., each afternoon at 2 p.m., and each evening session at 8 p.m. Morning session shall adjourn at 12.30 p.m. unless otherwise ordered by vote of the Convention. All sessions shall open promptly.

Any delegate or other member desiring to speak shall address the Chair, and unless called on by name shall begin by giving his name and place. Communications on subjects not entered in the programme will be limited to five minutes unless otherwise directed by vote of the Convention.

General resolutions, after reading, shall be referred to the Committee on Resolutions, without debate, and no general resolution shall be received after the opening of the Convention, without unanimous consent. Special resolutions relating to the conduct of the association may be read and considered at the discretion of the presiding officer after examination by him.

The time of speakers in general discussion shall be limited to ten minutes, and the time of speakers on questions or resolutions relating to the conduct of the Convention shall be limited to five minutes unless otherwise directed by vote of the Convention.

For the convenience of the Convention and speakers a bell will ring once three minutes before the close and twice at the close of the time allotted to each speaker on the programme. In the course of discussion and in addresses not entered on the programme, the bell will ring once, one minute before the close and twice at the close of the time allotted to the speaker under these rules.

Any speaker rising to address the Convention, who is in the employ, whether by retainer or otherwise, of any public service corporation which is interested in the action or subjects of deliberation of this Convention, shall mention the fact and nature of such employment before proceeding to speak.

THE WESTERN CANADA IRRIGATION ASSOCIATION

OFFICERS FOR THE YEAR 1915-16.

Honorary President—Honourable W. J. Roche, Minister of the Interior, Ottawa.

President—Honourable W. R. Ross, Minister of Lands, Victoria, B.C.

Honorary Vice-President—J. S. Dennis, Assistant to the President, C.P.R., Calgary.

First Vice-President—Honourable Duncan Marshall, Minister of Agriculture, Edmonton.

Second Vice-President—Honourable Senator Bostock, Ducks, B.C.

West of the Rockies—F. Maurice Smith, Penticton, B.C.

James Johnstone, Nelson, B.C.

J. L. Brown, President, Agricultural Society, Kamloops, B.C.

W. E. Scott, Deputy Minister of Agriculture, Victoria, B.C.

East of the Rockies—F. H. Peters, Commissioner of Irrigation, Department of the Interior, Calgary, Alberta.

R. A. Travis, Secretary, Board of Trade, Bassano, Alberta.

G. R. Marnoch, President, Board of Trade, Lethbridge, Alberta.

Joseph Dixon, Maple Creek, Saskatchewan.

Report of the Proceedings

Of the

Ninth Annual Convention

Of the

Western Canada Irrigation Association

Held at Bassano, Alberta

On

November 23, 24 and 25, 1915

OPENING SESSION--Tuesday, November 23rd--9.30 a.m.

The meeting assembled in Padden's Hall and delegates led by the orchestra joined in singing "God Save the King."

The Honourable Duncan Marshall, President of the Association called the meeting to order and said: "Ladies and Gentlemen,—I have very much pleasure indeed in expressing our very great pleasure at having the Lieutenant-Governor honour this meeting of the Western Canada Irrigation Association by attending it in person and I shall now introduce His Honour the Lieutenant-Governor, who will formally open this Convention."

Lieutenant-Governor Brett:"Mr. President, Members of the Western Canada Irrigation Association, Ladies and Gentlemen,—I am very pleased indeed to be here to-day to associate myself with the gentlemen who are devoting so much of their time and talents to this splendid work of irrigation. No better work can be engaged in by any citizen. It seems to me that the fact that so many are interested in it shows that they are men who fully realize their responsibilities of citizenship: the responsibility of developing the resources of this great country—one of the greatest heritages that has been given to man. In giving your time and attention you are doing a noble work. Without the full development of these broad acres in this splendid country, we never can hope that it will be what we all have hoped it would be, and what we expect from your efforts and the efforts of others engaged in a similar work, that it will become. To our friends from across the line I would join with Premier

Sifton in giving you a hearty welcome. I welcome you because you are taking an interest in this great work and have come here to give your mature experience and advice to the members of this Convention and I welcome you more particularly because the fact that you are here indicates that friendly relationship existing between Canada and the United States to the south of us. (Applause). I could not if I wished, attempt to give you any pointers on irrigation. What I do not know about it is a good deal. I will content myself with having the pleasure of listening and being educated along that line. I now declare this Convention formally opened." (Applause.)

Chairman: "This Convention is I have no doubt, very greatly pleased to have the Premier of the province of Alberta present who has come here to express the welcome of the province of Alberta to the delegates from Saskatchewan and British Columbia and visiting irrigationists from across the line. I have very much pleasure in introducing Premier Sifton."

Premier Sifton: "Mr. Chairman, Ladies and Gentlemen,—It appears already that there are two speeches of welcome and it almost works a supererogation to welcome delegates who have taken an interest in this Convention. On behalf of the province of Alberta, I am pleased to see so many delegates from British Columbia and Saskatchewan here for the purpose of assisting in this great work. It is unnecessary for us who have not been practically engaged in irrigation to explain to you gentlemen who have spent your lives at it, the practical effects of irrigation. You know what it has done for you. You know what it has done for the different places and districts from which you have come, and you know the difficulties and trials that there have been in this country to work up the irrigation question to the extent that it has reached at the present time. There will always be differences of opinion in regard to the irrigation question. Some years Providence looks after the matter of rain and you do not require irrigation and if it rains continuously for two or three years, we begin to think irrigation a needless expense and think it just as well to leave it altogether to Providence. But Providence has been benign in giving to this country water that can be stored for the years in which there is no rain. You who have lived in this country know that for some ten years it was overlooked in the rain storms. The snow did not fall and there were dry seasons in which grass would not grow and there was no feed or water for the cattle. Because for the past two or three years, there has been rain, some of us have forgotten that there have been dry years and there is always the possibility of such years coming again. There is no doubt it would mean ruin for this particular part of the country unless the surplus moisture was accumulated and stored for future use. There is no question in the minds of people who have been here some ten or fifteen years in regard to this matter. From 1885 to 1895 this particular portion of the country did not grow crops; nobody thought of putting in crops. It was no use. There were only a few people who grew anything but cattle and they spread them around here and then spent immense sums of money to water them. The times have changed now and for the last

few years with one or two exceptions, there have been excellent returns from this country but you have to ensure against the future and in the form of an insurance policy money spent for irrigation in this country is a thing we cannot afford to do without. We cannot afford either to have year after year go by without crops, and we can afford to invest money in insurance by way of irrigation profits, and I hope that the delegates that are here to-day will spend some time at least, in the discussion of the proper kind of crops to be raised in this particular portion of the country. Irrigation has been a wonderful success in the countries where you can grow fruit and where you can grow expensive crops and it makes a great difference how you grow them or what crops you grow when the country is worth thousands of dollars an acre, but in this country where so far ordinary crops have not been so successful, where even successful crops will be cheap crops, the main discussion of interest will be what kind of crops to grow under irrigation in this particular part of the country for the purpose of making irrigation a success. When this system was first introduced, I had a great many talks with Sir William White and also with Mr. Dennis and I took a great interest in it and my opinion has not changed at all although I am not a practical man in this line. I thought if they would devote attention to raising large crops of grain and feed and also starting of dairy farms in this section of the country it would make an undoubted success. I talked that to them at the time and I have not yet changed my mind in that respect. I would like to see people who have studied this thing and who have given practical attention to it come in as settlers and become settlers here accustoming themselves to the use of irrigation in this portion of the country, for it is the most profitable way of farming, and to keep on and make it what it should be, instead of a wilderness, a garden to the rest of these provinces. I thank you ladies and gentlemen for this opportunity." (Applause.)

Chairman: "This Convention decided one year ago to meet in the town of Bassano and His Worship Mayor Flanagan of the town is now to officially welcome the delegates who are in attendance at this Convention on behalf of the town."

Mayor Flanagan: "Mr. Chairman, Ladies and Gentlemen,—It is not my intention to try to make an address especially after hearing His Honour and Mr. Sifton. I just want to say to you how much we appreciate having you amongst us especially as you represent the Western Canada Irrigation Association. Irrigation is as you know, what we depend entirely upon, you might say, to make this one of the most populous centres of Alberta. Therefore, on behalf of the citizens of Bassano, I have much pleasure in welcoming you to our town. If there is anything we can do to make the time spent amongst us more pleasant, please command us." (Applause.)

Chairman: "The local arrangements for each one of these Conventions are under the direction of what is called the Local Board of Control. Mr. J. S.

Mayor Flanagan, of Bassano, Alta.

Mavor is Chairman of that Local Board of Control in Bassano and we shall now have a few remarks from Mr. Mavor."

Mr. Mavor: "Your Honour, Mr. Chairman and Ladies and Gentlemen,—It is a new experience, indeed a very pleasant one for me to welcome delegates to the Western Canada Irrigation Association meeting here to-day. It is very fitting in my own mind that this Convention should meet in Bassano, which by every right should be regarded as the capital of the irrigated area of the province of Alberta. We have been blessed during the past fall with a harvest which has brought sunshine to many a downcast heart because in former years throughout this particular district and farther to the south, we were suffering and suffering very badly from a lack of water. To insure against that this vast irrigation project now practically completed in the southern part of the province has been installed, and we hope that it will be a complete insurance against the failures which we have been subject to in the past from drought. We are duly thankful of course, that in the past year, we have not needed to bring water by artificial means to the land, but we know that we cannot have every year like this and probably next year and for many years to come the irrigation system established in this particular area will be a God-send to the farmers in the irrigated districts

It is a very remarkable fact that Western Canada is progressing the way it is in view of what is going on in the Old World. A holocaust of blood has not involved us personally, at any rate, in the terrible scenes that have been enacted in the old country. We have, and will have, with us probably during the Convention, a certain individual to remind us of the terrible horrors going on over there. In yonder chair sits a wounded hero hit in many places by shrapnel, and it makes us think when we look upon his manly face, that we have many, many things to be thankful for, and while we are probably doing what is necessary in providing necessary provisions for the army that is fighting for the right, we must not forget that we are dwelling in safety without the horrors surrounding us that are so close to every person in the countries of the Old World.

I am not very well versed in matters of irrigation with which this Convention will deal, but I presume it is met together with the idea of promulgating new ideas concerning the benefits to be derived from irrigation, based of course, upon practical experience, and I feel certain that with the large number of men present who are skilled in irrigation very many benefits will be forthcoming to the farmers generally throughout this country who are employing irrigation now and must use it in the future.

Permit me in closing to state again my pleasure as Chairman of the Local Board of Control, in joining with those who have spoken before to welcome you to our midst. I have forgotten one thing and that is, if the delegates do not already know, there is one man who has been indefatigable in his efforts to make this Convention a success. I refer to that Hercules of Publicity, Mr. Norman S. Rankin. I know that you will appreciate the amount of work which has fallen on his shoulders in bringing this Convention together and on

behalf of the Local Board of Control I give thanks to him for the very able and necessary assistance he has given us. I confess that I have not done what I should have done, probably, but to the local members I extend my personal thanks for their earnest and whole hearted assistance.

I hope that much good will result from your meeting." (Applause.)

Chairman: "As is generally known by the delegates here, the irrigation laws of Alberta and Saskatchewan are under the direction of the Dominion Government and particularly, the Department of the Interior. We have with us this morning, Mr. Bailey, representing the Superintendent of Irrigation at Ottawa and we will now have a few words from Mr. Bailey."

Mr. Bailey: "Mr. Chairman, Ladies and Gentlemen,—It was only a few moments ago when on entering this hall I saw a programme and noticed that Mr. Drake was down for a speech. He assured me that had he come he had no intention of giving any address. I therefore assumed that in representing him I would have an easy time and enjoy myself as an auditor. I know that Mr. Drake regrets being unable to be present at this time and at this moment I also regret it, but I can assure you of his continued interest in the work that this association is endeavouring to carry on, and he has at all times tried to do all in his power to further the interests of this association. I am not going to pretend to enter into a discussion of irrigation because I am not a practical irrigator—all my knowledge of irrigation having been gained in assisting the Superintendent of Irrigation in the administration of the Act. However, there are a number of irrigationists here whom I expect to meet and I look with pleasure upon the opportunity of listening to the discussions to take place. I expect to meet a number of people with whom I have been in correspondence. Hitherto, they simply meant names to me, but now I will be able to go back to Ottawa knowing them and taking a greater personal interest in my work.

I can assure you of the Honourable Dr. Roche's continued interest in the work of the Western Canada Irrigation Association. I have one thing to say that perhaps may be of interest to you. You know that in years past the Department of the Interior has published the report of the proceedings of this Convention. In 1907 the report of the association was quite a small pamphlet, but as the work of the association has grown the pamphlet has grown until now it is a large report and a very creditable one which makes interesting reading. In this respect it differs from a number of departmental reports which make rather dry reading, and I would like to say here that a great deal of the credit for such a fine report is due to your efficient Secretary, Mr. Rankin, for the splendid condition in which he sends his manuscript down for publication. It was feared that in view of the necessity for such strict economy in the expenditure of public moneys during the continuance of the war there might be some question as to publishing the report this year. However, I am authorized by the Honourable Dr. Roche, to say that the cost of publishing this report will be borne by the Department of the Interior as in former years. Your Secretary has also been notified that authority has been given for the

inclusion in the Department's estimates of the $500 grant to this association for next year. I think that this is practical assurance of the interest this department takes in your work. I am very glad to be here and hope to enjoy the future sessions of this association and to go back knowing you better and having learned a good deal. I thank you." (Applause.)

Chairman: The next feature on this programme is that unfortunate thing known as the Chairman's address. I will make this as brief as possible. I notice somebody who is a bit of a philosopher says "What is the source of all wealth?"—"Land," and at the bottom says, "What is the foundation of the Empire?"—"Home." Now if we get the home on the land, the source of all wealth, and the foundation of the Empire, I think we have got on pretty nearly all and it would seem to me if this man's philosophy is correct, the serious problem facing the farmer to-day is to get the right kind of homes on this land and I believe it is correct, and the business of getting the kind of homes that men like to live in and that women will like to live in on the land in our country is the most serious problem we have on hand and everything that conventions of this kind can do to improve farm conditions in the home, to make life more comfortable and satisfactory for people who live on the land, is the greatest thing to be done for people engaged in agriculture.

The foundation it seems to me of this thing is better training for the men and women who are going to farm in our country and better training for the boys and girls who are going to be better farmers of these provinces must begin in the public schools. It seems to me that the business of introducing agricultural education into our public schools in a practical and satisfactory way has perhaps been fairly long delayed. We have welcomed in the province of Alberta this year, the first real text book on agriculture for public schools that it has ever been my pleasure to read, and I was very glad indeed to have heard testimony on the train coming here yesterday that Dr. Rutherford said "the text book for agriculture for the use of the public schools is the finest text book on agriculture that I have ever read, and I am now reading it for the second or third time," he wished it was in the hands of every farmer in the province of Alberta. (Applause.) I was glad to inform him that the Department of Education in this province was making it their text book and one would be placed in the hands of every boy attending public school in the province of Alberta, and I hoped he would take it home and make his father read it. (Applause.)

I went to public school for a good while and it took me a good while to go through the public school anyway, and during that time I had a good many teachers and I have no recollection now of one teacher in a public school ever telling a boy or girl that it would be a good thing for him to stay on the farm or that the farm was a desirable place or that they could get something out of farming worth while, but all the smart fellows were encouraged to go on to high school and become public school teachers, and make money enough that way to take them into professions and other things in the business world and this is the thing that was dinned in my ears in the public school, I have no

recollection of any teacher encouraging a boy or girl to farm and do you wonder therefore, when these conditions are existing in our schools throughout the country, that there was so little aid given to agriculture.

If building homes on the farm is so important, we should get into the schools and into the minds of the public school teachers the right kind of spirit, that there is more to be got off the fields and out of life on the farm than there is in any other walk or calling in life. Until we do get public school teachers imbued with that view, we shall fail to get agricultural development along the lines that it ought to be developed.

I am not going to discuss agricultural education at any length, because Mr. Howes is on the programme to discuss it at this Convention, and I do not want to take up the time of the Convention in discussing it now. I want to say however, that during the last year we put on a campaign in the province of Alberta to get farmers' daughters to attend schools of agriculture. We never had any difficulty in getting the boys. All we had to do was to open the schools and the boys would come in. The old man will spend a couple of hundred dollars in a year on the boy because he thinks the boy will pick up something of value to him, but as to his daughter, he thinks that Bill Jones is paying some attention to her and Bill will probably take her off his hands and so he won't go to any expense about her as he thinks he would lose the investment entirely.

We found there was an absolute neglect in giving farmers' girls an opportunity for the kind of education they should have, and I am glad to say that we have more than doubled the attendance of farmers' daughters in our schools. I believe there is nothing in those institutions designed for giving boys and girls agricultural development more important than training girls and giving them new view points of the work they have to do in the farm home and the kind of training, and only that will make their work in the farm home a scientific operation instead of drudgery; that the making of butter will not be simply pounding cream until it turns into grease, but that, it is an operation requiring proper methods and proper treatment until it is made into the pure butter for the trade. If we can get this instilled into the minds of the girls and at the same time educate the boys in the schools to the fact that they have to make home surroundings more comfortable and easy for the wives and the sisters and the mothers in the home, we will be doing something real in agriculture. Have you ever heard a woman gossiping say, "Poor girl, she married a farmer." I do not think that there is any remark made that reflects so much discredit upon agriculture. We should have as many comforts and pleasures in our farm homes as we have in our homes in the cities. (Applause.)

In the country we have green grass to walk on. In the cities we are condemned to walk on concrete sidewalks. We have more freedom in the country than people have in cities and towns. The only thing to get into the minds of the boys and the girls is the "going to farm right" view point. Let me say to every farmer in this Convention; spend a week next summer fixing up your house; fix up the lawn; plant a few trees and flowers. They will be good to look at when you are tired; when you are sitting on the front porch just about

sundown you will find that you have not spent a better week in your life. I took that advice myself this summer. I took my two hired men, and with the little effort I can put in it myself, and I am not a very fierce worker in that line, we spent a whole week fixing up around our house and then after I got through and saw the result, I wondered why I did not do that long ago. If farmers would only do this, both inside and outside of their houses, and do it with some kind of care, they would impress the boys and girls with the fact that they can get as much pleasure in the country as in the cities.

There is another trouble with agriculture. It is no trouble for a farmer to spend a couple of hundred dollars for a gasoline engine, but he will growl for a year about putting $25 into a new washing machine that will lighten the work in the home. These are the things that will work for the permanency of agriculture in this country. I have heard women declare that they hoped their boys and girls would never be condemned to the life that they had lived and hoped to get enough money scraped together to get them away from that life. It will not be necessary if we can get the boys and girls and the women of this country to view this thing from the right standpoint and endeavour to make life on the farm home a place of contentment. Instruct the boys in scientific agriculture so that they will get as much enjoyment from summer fallowing and from raising the best calf in the neighbourhood as men do in a profession. That will be the secret of success in agriculture in our country. It seems to me that at a convention of this kind, whether it be a dry farm convention or a wet farm convention, so long as it is a gathering of farmers, some attention should be given to agricultural education, beginning with the public school, in order that boys in the country may be induced to stay on the farm and may learn some of the attractions and satisfactions in life that can be got out of it.

If these things were placed before our boys and girls instead of everlastingly trying to encourage them off the farm, we would be doing a great deal for agriculture.

We are talking about "back to the land" to the people who have been in the city all their lives, and I will lend my efforts to inducing as many as possible of those who have been unfortunate enough to live in the city to get out on the land. I think that is the sort of rescue work that people in agriculture should be engaged in. Get as many people as possible out of the city to the land where they can do something for themselves and the country, but, there is a problem more serious than that; that is, keeping on the farm the boys and girls who have gathered that fund of knowledge that is so hard for a man to gain after reaching a certain period of his life, whether it is on irrigated land or dry land.

I am pleased to see the trend of affairs this fall in the province of Alberta. The farmers have had splendid grain crops—two crops in one practically—and have been able to sell it for a good reasonable price. I am glad to see amongst these farmers a great demand for live stock. You find everywhere you go that the men who made good out of their wheat crops are investing a lot of money in live stock so that there will be a large increase in the live stock of this province, thus laying a foundation for raising of live stock in the province. It is an exceedingly hopeful sign that farmers who have got this

ROLL of HONOR

Capt. J. C. Dufresne
of Penticton
Member Executive

B. T. Gray
Chairman - Exhibition Committee
Bassano

splendid grain crop are providing against future emergencies by beginning to engage in mixed farming or live stock raising in this province.

It is not my intention to take up any more of your time. The different problems of irrigation will be discussed by those whose names appear on the programme, and I now have much pleasure in calling upon the Secretary, Mr. Rankin, to present his report. (Applause.)

SECRETARY: Mr. President, Ladies and Gentlemen,—The past year's operations of this Association have not been perhaps as active as other years, but, as you know, we have been faced by unusual conditions, and to have come through as we have, is to-day the subject of congratulations. That we should have been able to hold our Convention this year, and include with it an Exhibition of Soil Products, is, I hope you will agree, satisfactory evidence of the interest our Executive and delegates take in the work of the Association.

When the war broke out in August, 1914, we were urged to cancel the Convention which had been arranged for at Penticton, but as some of the money voted for Convention purposes have already been expended, and it was the desire of the Penticton people to hold the meeting, no postponement was made. One hundred and seventy-four registered delegates took part at the Convention, which, while not the high-water mark of actual attendance of the public, is the record for duly qualified delegates.

It has been difficult to finance this year, and in another part of this Report I bring out the fact that were it not for the interest and co-operation of certain individuals, it would have been almost impossible to have held this Convention here to-day, and certainly out of the question to have put on the present Exhibition of Soil Products.

The work of the Association during the past year is dealt with in detail in the Annual Report which will be published, and I do not propose now to take up the time of the meeting discussing it. Several resolutions brought forward at the last Convention have been followed up and dealt with, and any who are particularly interested in the course of these resolutions at the present time can learn of them from the study of the files, which are open for inspection on the small table in the hall.

These resolutions will be found set forth in detail in the Eighth Annual Report (of the Penticton Convention), copies of which were mailed to all delegates early in the year. If anyone desires to refer to them at the present time, there are a limited number of copies on the table by the entrance door. Perhaps of greatest importance to British Columbia delegates is Resolution No. 4.

Resolution No. 4 reads as follows:—

"WHEREAS it is acknowledged that the so-called dry belts of British Columbia are among the most important fruit-growing centres of Western Canada; and

"WHEREAS the development of these districts along horticultural and agricultural lines to the maximum area profitable and at the earliest date is essential; and

"WHEREAS this development depends on an adequate supply of water for irrigation purposes;

"BE IT RESOLVED that it is in public interest that investigations be carried on as speedily as possible, with a view to the Government eventually considering the policy of constructing dams and storage reservoirs, if it is found by such investigations that there is sufficient land reclaimable, as will justify the work, and produce a revenue that will in the course of a reasonable time return the cost of construction and maintenance."

This brought the following letter from the Comptroller of Water Rights, Mr. Young:—

"Yours of April 4th, with enclosed copy of Resolution No. 4 passed at the Penticton Convention of the Western Canada Irrigation Association last summer, to hand.

"The resolution 'That it is in the public interest that investigations be carried on as speedily as possible, etc.,' has to a considerable extent been complied with.

"During the season of 1914 no expense was spared to rush the work of reservoir investigation in the vicinity of Naramata, Summerland, Westbank and Kelowna. This season the work undertaken last year will be completed and will have a direct bearing on the organization of Irrigation Corporations in Naramata, Westbank and Kelowna. At Peachland the first steps towards the organization of an Irrigation Corporation have been taken. The preliminary engineering investigation is now in hand and will cover reservoir possibilities, although there has been in the past no water shortage.

"I am instructed by the Honourable the Minister to say that the policy of constructing dams and storage reservoirs will not be taken up until all information is in hand. In some cases the cost of conservation is out of proportion to the benefits to be received; in others the contrary will be found. It is, therefore, of the highest importance that before coming to a final decision on this point, many streams must be carefully studied and land classifications made to determine to what extent a creek will irrigate land by the development of its reservoir sites."

INTERNATIONAL IRRIGATION CONGRESS, CALGARY, 1914.

The twenty-first Meeting of the International Irrigation Congress was held for the first time in Canada at Calgary on October 5th to 9th, 1914, inclusive, and was well attended.

Amongst prominent Canadian Irrigationists and Agriculturists, Messrs. F. H. Peters, Dominion Commissioner of Irrigation; the Honourable W. R. Ross, Minister of Lands, British Columbia; Honourable J. A. Lougheed, Senator; William Young, Comptroller of Water Rights, British Columbia; D. W. Hays, Chief Engineer, Southern Alberta Land Company; Robert S. Stockton, Superintendent of Operations and Maintenance, Department of Natural Resources, Canadian Pacific Railway, Strathmore; A. F. Mantle, Deputy Minister of Agriculture, Saskatchewan; H. B. Muckleston, Assistant Chief Engineer, Depart-

ment of Natural Resources, Canadian Pacific Railway; Dr. J. G. Rutherford, Superintendent of Animal Husbandry, Canadian Pacific Railway; E. F. Drake, Superintendent of Irrigation, Department of the Interior, Ottawa; and J. S. Dennis, Chairman, Board of Control, took part.

The Congress was opened by His Honour G. H. V. Bulyea, Lieutenant-Governor of Alberta, who read telegrams of felicitation from H.R.H. the Duke of Connaught, Governor-General of Canada, and President Woodrow Wilson of the United States.

Members of the Western Canada Irrigation Association will read with interest the commendation given by the Committee on Resolutions to the work of this Association in promoting the development of irrigation in the Western Provinces of Canada, and in the betterment of farm life and conditions generally.

As the report which is being issued by the Dominion Government will carry a very full account of this Congress, I will limit my information to a report of the Committee on Resolutions, which was as follows:—

REPORT OF THE COMMITTEE ON RESOLUTIONS

Your Committee on Resolutions respectfully report as follows:—

CONSOLIDATION OF INTERNATIONAL IRRIGATION CONGRESS WITH INTERNATIONAL DRY FARMING CONGRESS.

RESOLVED that we favour the federation of the International Irrigation Congress and the International Dry Farming Congress, and to that end, direct the Board of Governors of this Congress, either as a body or by Sub-committee, to work with a like Committee from the International Dry Farming Congress for the purpose of arranging and planning details for the amalgamation of the two Congresses; the Board of Governors to report its conclusions and recommendations to this Congress at its next session.

IRRIGATION DISTRICTS

RESOLVED that we recommend the passage by Congress of an Act authorizing the Secretary of the Interior to enter into contracts with irrigation districts created under state law, by which the responsibility and control of each reclamation project arising from the Reclamation Act of June 17th, 1902, may be turned over to an irrigation district organized under said law; and in the case of inter-state projects, we recommend that suitable federal laws be enacted by which inter-state irrigation districts may be formed; and in order that federal projects may be turned over to the landowners, as contemplated by the Reclamation Law, we recommend the careful revision and unification of irrigation district acts by the states of the arid regions, to the end that such projects may be turned over to the control of the settlers through such agency.

FINANCIAL SAFEGUARDS

RESOLVED that full examination be made by experienced engineers in the employ of the national, state and federal governments in advance of financing the construction of each large irrigation project, and that no such enterprise be entered upon by the government agencies unless it appear that such projects can return at least three per cent. of the total investment for land and construction.

FEDERAL CONTROL OF INTER-STATE WATERS

We hold that federal control as between those states which are not in full possession of their natural resources is essential to the equitable distribution and utilization of the waters of inter-state streams.

RIVER REGULATION

We commend the efforts by the United States Congress to create a Board of Regulation, and urge the enactment of suitable laws providing for complete river regulation beginning at the head waters and including forest protection and reservoir construction.

WELFARE OF SETTLERS UNDER RECLAMATION PROJECTS

We believe the United States Reclamation Service has fully carried out the purpose of the Reclamation Act in so far as the construction of engineering works is concerned. Experience has, however, demonstrated the expediency of extending to the service additional authority to the end that it may promote, at first hand, the welfare of the settler upon the land.

STREAM GAUGING AND TOPOGRAPHIC SERVICE

We urge the federal governments the necessity for more liberal appropriations for the work of topographic survey and hydrographic stream gauging work; and we urge the stronger co-operation by several states and provinces in asking appropriations for this important work.

IRRIGATION SECURITIES

We urge that the states of the arid regions assume their proper moral and legal responsibility for the success of the Carey Act Works, and state irrigation districts, and pass such laws as will enable the completion of all meritorious projects now undertaken.

IMPROVING FARM CONDITIONS.

We recommend that the federal governments empower commissions to investigate and report and make recommendations in relation to the various colonization systems in vogue in other countries, and concerning rural settle-

ment, as well as the methods of national or state co-operative farm banking, credit and marketing systems.

FUTURE WORK OF THE CONGRESS

The International Irrigation Congress has been in existence for the past twenty-three years. Its original purpose was to arouse public interest to the end of revising and reforming the irrigation legislation of the Western States, and of inducing the Federal Government to inaugurate a national policy of arid land reclamation. Largely through the efforts of this organization, practically all the Western States and Provinces have enacted irrigation laws based upon sound legal principles and designed to establish irrigation practices which would turn to the best account the land and water resources of the country. The Federal Governments have fully committed themselves to the policy of arid land reclamation, and to the extent to which sound irrigation laws and practices have been established, and important irrigation works have been constructed, the original purpose of the organization has been fulfilled. Therefore, we recommend that this organization now pass on to the more serious consideration of those problems upon the solution of which depend the success of the investor in irrigation enterprises and the happiness and welfare of the settler upon the lands.

ACKNOWLEDGMENT

RESOLVED that the sincere thanks and cordial appreciation of this Congress be made known to His Excellency the Lieutenant-Governor of Alberta, G. H. V. Bulyea; to His Honour the Premier of Alberta, Hon. A. L. Sifton; and to His Worship Mayor Sinnott and Aldermanic Council of Calgary, and the citizens of Calgary; to Mr. J. S. Dennis and his able corps of assistants in the Natural Resources Department of the Canadian Pacific Railway Company; to the Board of Control, individually and collectively; also to the Irrigation Congress Chorus, and to Mr. Max Weil, its able conductor; and to the public press.

We commend our distinguished President, Major Richard W. Young, for his leadership and ability and impartial conduct in the Chair; and we commend our Secretary, Mr. Arthur Hooker, for his able services.

We extend the sincere thanks of this Congress to the Dominion Government of Canada, and to the Federal Government of the United States, for the earnest co-operation of their talented experts in the respective departments of the Interior and of Agriculture; and also to the respective provincial governments of Alberta, British Columbia and Saskatchewan.

We commend the splendid work of the Western Canada Irrigation Association in its past eight annual conventions, in promoting the development of irrigation in the western provinces of Canada, and in the betterment of farm life conditions; and we especially commend the Department of Interior and its Irrigation Branch for the appropriations which have made possible the publica-

tion and distribution to the public of the printed proceedings of the various conventions held by this Association.

Respectfully submitted,

(Signed) J. T. HINKLE, *Chairman.*
(Signed) WM. J. THOMPSON, *Secretary.*

TWENTY-SECOND INTERNATIONAL IRRIGATION CONGRESS, CALIFORNIA, SEPTEMBER 13th-20th, 1915

At the request of your Secretary, who was unable to attend the International Irrigation Congress held this year in California, Mr. F. H. Peters kindly furnished the following report: Your representatives at the Congress were F. H. Peters and Hugh Muckleston.

"I am submitting to you herewith some notes with reference to the Twenty-second International Irrigation Congress, so that in accordance with your desire, you may send a short report to the Officers of the Western Canada Irrigation Association.

"The feature of the method of carrying on the Congress was 'putting the Congress on wheels and holding the meetings at several different points. This was a great success and carried out the idea of bringing the Congress into a number of interested communities, and also resulted in the delegates to the Congress gaining a much better idea of the local conditions in the irrigated districts of California than would have been possible under the previous procedure.

"The principal meetings of the Congress were held at Stockton, Fresno and Sacramento, at all of which places one whole day and two evenings were devoted to meetings, while one day was devoted to driving the delegates out through the irrigated districts in the vicinity. At all of these places the local people, usually under the direction of the Local Boards of Control, supplied motor cars to carry the delegates, and in addition to this a very nice feature of the arrangements was that in travelling between the different towns special trains were arranged for, so that all the delegates travelled together. At Fresno, the arrangements had been specially arranged by Mr. A. L. Nares, who is Manager of the large irrigation company operating ditches in the district surrounding Fresno. The trip to Fresno included a motor drive of over one hundred miles and a most interesting visit to some very large reservoir sites that are proposed for the storage of water to allow, in the future, of a great extension of the irrigated districts. A luncheon was served at the company's headgates, and at this place a short informal meeting of the Congress was held in the open air.

"The final meetings of the Congress were held in Festival Hall in the Exposition Grounds at San Francisco, and in travelling from Sacra-

mento to San Francisco a few of the delegates took advantage of a very kind invitation from the Drainage Engineers' Section of the International Engineering Congress and travelled down the Sacramento river in a special steamer, which gave an excellent opportunity of viewing the wonderful delta lands along this river and getting an idea of the dyking reclamation work that has been carried out in the past and is now undergoing considerable improvements.

"At the meetings in San Francisco on the afternoon of September 20th there was an excellent attendance of the delegates, and this was especially pleasing because at other similar meetings which had been held in the Exposition Grounds great difficulty had been found in getting the delegates into the hall on account of the great attraction of the general Exposition.

"The only disappointing feature of the Congress was the lack of interest that was shown in attending the meetings by the local people. This was probably due to the fact that no musical programme or anything of this sort was arranged and probably at future meetings some attention will be given to this point.

"I think attention should be given to the idea which was carried out at Fresno and Sacramento, where sectional meetings were held. This idea appears to the writer to be a very good one because it not only doubles the available speaking time, but also allows of getting together the men who are specially interested in certain subjects and this has the effect of getting out a good deal more discussion on the papers which, in many cases, is the most interesting part of the programme.

"Speaking generally, the Congress was a great success and many excellent papers were read or delivered. The attendance of the delegates was not large, and probably not over one hundred and fifty or one hundred and seventy-five, but all of the delegates who were in attendance appeared to be very much interested in the proceedings and attended the meetings with great regularity. The Congress showed that much earnest work had been done in preparing for it, and if the suggestions made and the resolutions passed are followed up in the future the results will be most far-reaching.

"As indicated in a short report which I sent to you after the first meetings the Congress has made a great reduction in the cost of carrying out its meetings, and this fact, together with the desire which was evident at all the meetings, at all times, have the truth expressed in connection with any subject and face all issues fairly are all thought to be indications of the future policies to be followed by the Congress. In view of the fact that this Congress has recently come under some criticism, it is only fair to say that in the writer's opinion the Congress seems to have risen above these criticisms, and if the same useful meetings are continued there can be no doubt as to the future success and usefulness of the Congress.

"The most important subject that was dealt with by the Congress was that of obtaining adequate financial assistance for farmers who are on the land and the most favoured plan was some system of rural credits. The fact that British Columbia and Saskatchewan have both passed measures which have in view provincial government assistance for the farmers was most favourably commented upon by the American delegates as indicating the progressive spirit in Canada. Another point which did not receive so much attention, but which was very forcibly brought out by one or two prominent men, was that no more extensions of irrigation projects should be undertaken until the projects which have already been put under way have been successfully colonized and put on a sound basis.

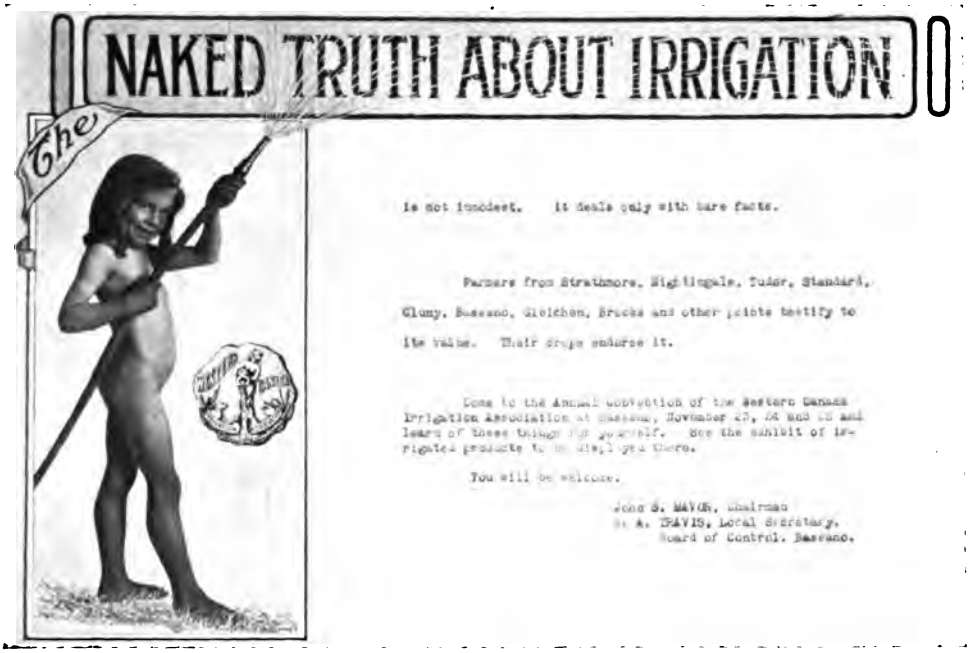
"During the whole of the Congress the treatment of the Canadian delegates was given special attention, and the flattering remarks that were made with reference to the Congress held last year in Calgary, together with the great regret that was expressed by the President and other speakers that Mr. J. S. Dennis had not been able to attend, all indicated very strongly the interest which is now being taken by the organization in Canadian irrigation development.

"At the final meetings in San Francisco the Honourable Walter Scott, Premier of Saskatchewan, spoke on behalf of Canada. This was a special honour because the usual call of the states was entirely omitted from the programme, and at the San Francisco meetings only two foreign delegates spoke, the other one being the Chinese Envoy and Plenipotentiary. During the ordinary meetings an interesting but informal address was given by Mr. E. F. Drake, Superintendent of Irrigation, on 'Colonization in Canada,' and the Honourable Alexander Lucas, of British Columbia, delivered a most able address on 'Rural Credits.' Mr. F. H. Peters, Commissioner of Irrigation, delivered an address on 'Irrigation in Alberta and Saskatchewan.'

"The incoming President, Mr. Burgess, appears to have been a very happy choice on the part of the Congress, and no doubt, under his direction, a very successful meeting will be held next year. The indications are that the mext meeting place will be at El Paso, Texas, and at the same time ceremonies will be carried out in connection with the opening of the Elephant Butte Dam, which is just being completed by the United States Reclamation Service.

"I trust that these notes that I have made above will meet your purpose.

(Signed) "F. H. PETERS."


NAKED TRUTH ABOUT IRRIGATION
The
is not immodest. It deals only with bare facts.
Farmers from Strathmore, Nightingale, Tudor, Standard, Gleny, Bassano, Gleichen, Brooks and other points testify to its value. Their crops enforce it.
You will be welcome.
Board of Control, Bassano.

One of the Post Cards used to advertise the Convention.

OREGON IRRIGATION CONGRESS

Headed by the Hon. Duncan Marshall, Minister of Agriculture for the province of Alberta, and president of the Western Canada Irrigation Association, and including F. H. Peters, Dominion Commissioner of Irrigation, Calgary, a delegation from the Western Canada Irrigation Association attended the Fifth Annual Meeting of the Oregon Irrigation Congress at Portland, January 7th to 9th.

Delegates representing water users from all over the state were present. Oregon was the first state in the Union to ever ask direct appropriation for an irrigation system and voted $450,000 to construct the Tumalo project, which, it was reported at the Congress, had been completed to the satisfaction of the engineers and interested farmers. All parts of the state clamoured for water on their land at this meeting, but after considerable discussion, it was decided that unless all sank their local needs for the good of the state in general and the greatest possible number, no further help from the Legislature could be expected in this regard. Accordingly, Congress passed a resolution recommending to the state Legislature a tax levy of one-half mill, the proceeds of which, amounting to $425,000, would be invested in some one irrigation project in the state, the investment to be made on the understanding that the Federal Government at Washington would meet this appropriation with a like sum. Hope was expressed by the meeting that if this plan were carried through it might run on for year after year until the greater part of the state of Oregon, for which water is so necessary, would eventually be supplied with irrigation.

When this resolution came before the local Legislature, however, on February 5th, the total number of votes in favour of the bill was 13; the full 47 remaining votes were registered against it, and when the matter later went before the Federal Government at Washington for the consideration of an appropriation of a like sum for the same purpose, the Federal Government declined to approve it on the grounds that as Oregon was not sufficiently interested to do so they should not be called upon.

The following news telegram was sent out to the Western Canadian Press on the evening of the close of the first day's session:—

> "Clamouring for state and federal aid get water on their land, three hundred fifty farmers representing every county Oregon came together today in Fifth Annual Meeting Oregon Irrigation Congress under auspices Portland Commercial Club. All counties are sinking their local needs in uniform demand for aid to benefit greatest possible majority. Oregon is first state in Union make direct appropriation for irrigation systems, with result sixteen other western states pressing their legislature under this precedent. Canadian delegation representing Western Canada Irrigation Association, with whom came Hon. Duncan Marshall, Minister Agriculture, Alberta, warmly welcomed, given prominent places today's, tomorrow's programme. At banquet tendered Irrigationists by business men this city tonight, Hon. Duncan Marshall, chief speaker to supercrowded room, spoke hour half on 'Development Agriculture, Agricultural Education Alberta.' He will again address Congress by special request before leaving tomorrow. F. H. Peters, Commissioner Irrigation Department Interior, Calgary, will also address

BE GREAT, THEREFOR BE AN IRRIGATOR.
The Greatness of any people depends upon the Prosperity, Health and Contentment of its Rural Population.
Irrigation creates Prosperity from Water, Sunshine and Soil.
Happiness creates Health; Health Contentment and Contentment Greatness. To be Great be an Irrigator.
Attend the Bassano Irrigation Convention, Novr. 23, 24 & 25 and hear what experienced irrigators have to say. You will be welcome.
John S. MAVOR, Chairman
R. A. TRAVIS, Secy.
Board of Control.

One of the Post Cards used to advertise the Convention.

on 'Canadian Irrigation Law.' Congress marked by greatest attendance from men on land, co-operation, commercial, industrial, business interests, with general realization that greatest prosperity can only be achieved through assistance rendered farmer and irrigationist. Governor state, Editor 'Portland Oregonian,' President State Agricultural College, other prominent professional business men taking active energetic part in movement."

Hon. Duncan Marshall made two stirring speeches before the delegation on "Agriculture and Agricultural Education in Alberta," while Mr. F. H. Peters spoke briefly along general irrigation lines. The Congress took a standing vote of thanks to the Canadian delegates for their attendance and promised that a delegation from the Oregon Irrigation Congress would attend the 1915 Convention in Western Canada to be held this fall at Bassano.

THIRD ANNUAL CONVENTION CYPRESS HILLS WATER USERS' ASSOCIATION

The following article, from a local paper, is descriptive of the Third Annual Convention of the Cypress Hills Water Users' Association held at Maple Creek, March 10th and 11th. Your Secretary co-operated with the Secretary of the Cypress Hills Water Users' Association in drawing up a programme for the meeting and in assisting to secure desirable speakers.

"Back to the Land—but don't forget the Water."

"Back to the Land—but don't forget the Water"; in words more or less to this effect, J. S. Dennis, Assistant to the President of the Canadian Pacific Railway, and head of that company's vast irrigation interests in southern Alberta, addressed the delegates to the meeting of the Cypress Hills Water Users' Association gathered at Maple Creek, Saskatchewan, for their Third Annual Convention recently.

Although Alberta is usually looked upon as the centre of irrigation works in the Prairie Provinces of Canada, it should be noted that southwestern Saskatchewan and the Cypress Hills district is an important centre also. Amongst the first irrigation to be done in the West was the employment by the ranchers in the early days, for irrigation purposes, of small streams in these hills, principally for the irrigation of hay and fodder crops, until at the present time there are some 276 small irrigation projects covering an approximate acreage of 65,000. Small reservoirs were constructed and the flood waters stored. This was run over the land and resulted in the production of heavy crops of wild grass. This directed the attention of settlers to the possibility of using water for raising grain, alfalfa, roots and vegetables, and as the interest of irrigators increased through the assistance given to them by the Irrigation Branch of the Department of the Interior, whose head office is at Calgary, the Cypress Hills Water Users' Association was formed and affiliated with the Western Canada Irrigation Association, which has been in existence nearly a decade.

The Third Annual Convention was attended by upwards of one hundred and fifty farmers, many of whom drove in to Maple Creek distances of thirty to fifty miles to listen to the speakers and take part in discussions. The interest in this gathering was shown by the farmers, for the early spring had already begun to break up the roads, and while they came by sleighs from the hill district, when they reached more level lands they were obliged to abandon this mode of conveyance for wheels or horseback.

On the programme were members of the Legislative Assembly of Saskatchewan, representatives of the Irrigation Branch of the Department of the Interior; the Department of Agriculture of Saskatchewan and Alberta; the Canadian Pacific Railway; the Western Canada Irrigation Association and others. Hon. W. R. Motherwell, Minister of Agriculture, dealt largely with summer fallowing, stating that he was pleased to see that at an irrigation meeting, dry land or non-irrigated farming was also a topic of discussion. He told the water users that he intended to make a trip over the Cypress Hills to familiarize himself with the extent of their work, and further, that he would do what he could to arrange a small financial grant to help them through the coming year.

J. S. Dennis let his hearers know that he believes in irrigation. While he recognized the value of dry farming, he said he was firm in the conviction that every acre of land that can be irrigated should be brought under the ditch, as an acre of irrigated land will produce more wealth than an acre of the best dry land on earth. He told the irrigationists that the breaking of land in the district would not diminish the amount of water in the creeks. "True, water would not reach the natural runways so rapidly, but this would be better for the irrigationists as it would insure them a regular supply of water and the waste at flood periods would be reduced."

F. H. Peters, Commissioner of Irrigation for the Dominion Government, in an interesting address illustrated by charts, showed how crop results could be increased by the application of water. He said he assumed that the dry land farmer practised summer fallowing to conserve the moisture, which was a clear indication that he realized the value of moisture. "Why not then," he asks, "when irrigation was available, should the farmer leave one-third or one-half of his land vacant in summer fallowing each alternate year when by employing irrigation on his land he could make the entire unit productive each year?" Referring to the great tracts of irrigated land in southern Alberta and to the Canadian Pacific Railway's Irrigation Block, he expressed surprise that the citizens of Calgary had not expressed more enthusiasm over the possession of such an asset. Were $20,000,000 invested in any other form of investment, every piece of literature issued by the city of Calgary and Provincial Government would refer enthusiastically to it and every citizen be a walking advertisement for it, for it would eventually place contiguous to the city on the irrigated land, the most intensely settled farming district in Western Canada.

On the evening of the 10th, a special supper was provided the delegates by the Board of Trade, at which Mr. G. R. Marnoch, President of the Lethbridge Board of Trade, outlined in an interesting address how Lethbridge endeavours to co-operate with farmers in the district. Mr. Peters also responded to the toast of our guests.

After the supper all adjourned to the local theatre, where Norman S. Rankin, Secretary of the Western Canada Irrigation Association, gave a talk on the Panama Canal and Panama-Pacific International Exposition, illustrating his lecture with nearly 100 slides. It is believed that western farmers will save six or seven cents a bushel on transportation charges as a result of the canal. Both the banquet and the lecture were given to crowded houses.

The following officers were elected for the ensuing year:—

Hon-President—D. J. WYLIE, ROBERT NEEDHAM, WM. PEARCE, HON. WM. MOTHERWELL, R. G. WILLIAMSON and W. HUCKVALE.
President—T. A. HARGRAVE, Walsh.
First Vice-President—ISAAC STIRLING, Nashlyn.
Second Vice-President—JOHN DIXON, Maple Creek.
Executive—L. E. RICHARDSON, DAVID KEARNS, GEO. STEWART, A. S. UNSWORTH, DAN DRINAN, J. M. SPANGLER, CLARENCE ARMSTRONG, SPENCER PEARCE, W. A. BURTON.
Secretary—G. S. HERRINGER.

R. G. Williamson was chosen as a delegate to Bassano, Western Canada Irrigation Association Convention

R. J. Burley was chosen as representative to St. Paul at meeting of International Waterways Commission.

The next place of meeting was left open.

A number of other men prominent in irrigation and agriculture spoke instructively on various subjects connected with the improvement of agriculture, and resolutions dealing with the sending of a delegation to the International Waterways Commission at St. Paul; the construction of reservoirs by the Government; the establishment of a demonstration farm in the vicinity of Maple Creek; the sending of a delegation to attend the Western Canada Irrigation Association Convention at Bassano this summer, and others were passed.

Honorary President D. J. Wylie, M.L.A., was in the Chair, while President Williamson, Wm. Pearce, F. W. Green, Mayor Redmond and others occupied seats on the platform.

INTERNATIONAL WATERWAYS COMMISSION

Relative to the appointment of a delegate from this Association to attend the meeting of the International Joint Commission to look into the matter of the division of the waters of the Milk and St. Mary rivers, about which the executive were written on various occasions and on which their vote to send a representative was taken in April, the executive nominated William Pearce as the Association's representative. Accordingly, Mr. Pearce attended the preliminary meeting held at Winnipeg on May 20th and the official meeting held at St. Paul on the 24th. The following is the report submitted to the executive by Mr. Peace upon his return.

REPORT ON SITTING OF INTERNATIONAL WATERWAYS COMMISSION

I left here on Friday, the 21st May, reaching St. Paul on the night of Sunday following, and left St. Paul on Friday, 26th, reaching Calgary on the evening of the 30th. I accompanied Mr. Dennis, Assistant to the President, Canadian Pacific Railway, and Mr. Geo. A. Walker, of the Legal Department Canadian Pacific Railway, to St. Paul. At St. Paul we met the Counsel for the Dominion, Mr. McInnes; Mr. Drake, Superintendent of Irrigation; Mr. Peters, Commissioner of Irrigation; Mr. Burley, of the Irrigation Branch; Mr. John Stocks, of the Department of Public Works for the province of Alberta; Mr. Hunt, formerly Deputy to the Attorney-General, now, I understand, Secretary to the Executive Council of Alberta; and Mr. Mantle, Deputy Minister of Agriculture for Saskatchewan.

The meeting of the Commission was opened at 10.30 on Monday morning in the Federal Building at St. Paul, and it was suggested by the Chairman that as the Commission had some other business on hand which required attention, the representatives of the two countries should meet together and perhaps they could come to an understanding on many points of the controversy. The engineers had been trying to get together and eventually succeeded fairly well in many of the matters of the measurement of water made by the officers of the two countries.

It might be mentioned that Mr. Newell, formerly chief of the Reclamation Service, and Mr. Morris Bien, who is now Legal Adviser to the said Service, a couple of gentlemen of the said Service whose names I cannot at present call to mind, connected with the Reclamation Department in Montana, particularly in the matter of the stream measurements and the recording of old water rights, a Mr. Wyvel, who was Solicitor for the Department of State, and Mr. Sands, who represented the Water Users of the State of Montana, were present. There were some other parties also who were looking after various interests, but beyond those mentioned none took a prominent part in the investigation.

At the meeting of the representatives of the two countries, held at the suggestion of the Chairman of the Commission, no progress was made. The action of those representing the Reclamation Service in the United States would indicate that they thought it was in their interest to let things drift. It was thought probable that the object in view was:—As the Reclamation Service in the United States is being carried out by the Government, the Government could afford to take the risk of all uncertainty of the division of the water under the circumstances, whereas private capital would, of course, necessarily be deterred from taking such risks, and that seemed to be the course of the Reclamation Service all through. Its contention was that the Commission was restricted in the scope of its enquiry, that it was not its province to lay down how the division of the waters of the Milk and St. Mary rivers was to be made between the two countries, but restricted to the measurement of the water that might be required by use from time to time by the various water users of said countries. It will thus be seen that if before the principle of the division of the waters was finally adopted by the Commission, one or other parties had succeeded in absorbing a large amount of such water, it might then be considered, and possibly

successfully contended, as having a vested interest to the amount of its use, even though that amount was more than one-half of the whole of the waters of the two countries.

Another point in the contention of the United States was, that the division of the waters was to be confined wholly to the waters which crossed the international boundary. That all of those streams—of which there is a large number, and whose total amount in volume is very considerable—which rose in Montana and emptied into the Milk river after the said river had flowed out of Alberta, were not to be taken into consideration. The Canadian contention was, that the language of the Treaty referring to the waters of the river means all the waters in the watershed of the stream regardless whether these waters rise in Canada or the United States or flow across the boundary. The contention of the United States was ably combatted at the meeting of the representatives, by the legal representatives of the Dominion Government and of the Canadian Pacific Railway, who were assisted by others, particularly by Mr. Dennis. Mr. Newell, speaking on the lines of the contention made by the Reclamation Service, stated that it was impossible to make a division of the waters, as it was a matter that would vary from day to day owing to climatic and topographical conditions. Mr. Newell stated they had made a study of the proposition, thinking possibly a basis of division could be worked out, but they concluded it was impossible.

The hearing opened on Tuesday and was continued two sessions a day of two or two and a half hours each until the adjournment on Friday evening, when it was practically concluded, nothing left then except to put in certain reports and other exhibits by both parties.

The general witnesses for Canada were Mr. Burley, Mr. Peters and Mr. Drake, each of whom gave evidence at very considerable length, that of Mr. Burley being most important and lengthy. Mr. Dennis gave valuable evidence on points at issue. Mr. Hunt, representing the Alberta Government, and myself, representing the Western Canada Irrigation Association, also gave short evidence. My evidence was to prove to some extent the area that could possibly be irrigated from the waters of the St. Mary, that is assuming we had sufficient of them, and also the quality of such land, and the fact that under the present condition of affairs no private capital could be successfully obtained to prosecute any such enterprise, and therefore it was in the interest of the water users of Alberta to have the division of the water definitely fixed, and the same principle applied to the Cypress Hills water users also. Mr. Hunt gave evidence along similar lines. Of course, he was able to state what the legislation of the last session of the legislature was, giving power to form irrigation districts and borrow money on a bond issue and tax the parties benefiting for the interest and indemnification for said bonds. Mr. Mantle also gave evidence on the same lines as did Mr. Hunt and myself, so far as the water users within the province of Saskatchewan were concerned.

As part of the Canadian case, a tentative scheme of division illustrated by graphs was submitted to the Commission for the purpose of demonstrating how an equal apportionment could be made in accordance with the provisions of the Treaty, and so as to "afford a more beneficial use to each."

Of course the matter of having a considerable representation from Canada there, probably, and I think certainly, strengthened to some extent the Canadian contention. In other words, it demonstrated to the Commission that it was a matter in which a very considerable interest was being taken.

Mr. Newell presented the case very strongly on behalf of the Reclamation Service, and Mr. Bien made an argument also from the legal standpoint. The case as presented by Mr. Wyvell and by Mr. Sands did not impress one as favourably; at least the Canadians felt that a much stronger presentation was made by Mr. MacInnes.

Of course, it is impossible to foresee what the result will be, but in any event I think Canada can feel that she has done about all that reasonably could be done to make a favourable presentation of her case, and also that her case was a most equitable one.

A period of sixty days was fixed by the Commission for the filing of written arguments by any party interested, so that no decision may be looked for before then, and possibly not for some time longer.

Respectfully submitted,

(Signed) WM. PEARCE.

THE INTERNATIONAL ENGINEERING CONGRESS

At the International Engineering Congress, held in San Francisco September 20th to 25th, the following men, well known to Canadian Irrigationists, spoke:

IRRIGATION.

Irrigation Enterprise in the United States.—C. E. Grunsky, Dr. Ing, Mem. Am. Soc. C.E., San Francisco, California.

Economic Advisability of Irrigation.—F. H. Newell, Mem. Am. Soc. Mech. Engrs., Prof. Civil Engrs., University of Illinois, Urbana, Illinois.

Distribution Systems, Methods and Appliances in Irrigation.—J. S. Dennis, Asst. to the President, C.P.R., H. B. Muckleston, Mem. Can. Soc. C.E., and R. S. Stockton, Mem. Can. Soc. C.E., Calgary, Alberta, Canada.

The Distribution of Water in Irrigation in Australia.—Elwood Mead, Mem. Am. Soc. C.E., Mem. Inst. C.E., late Chairman State Rivers and Water Supply, Comm. of Victoria, Australia, Berkeley, California.

Mr. H. B. Muckleston, who attended the Congress as your representative, has at your Secretary's request, furnished the following report:

"A great International Exposition to celebrate some historical event is usually made the occasion for all sorts of conventions and congresses, and the P.P.I.E. has not been an exception.

"Of the hundreds of conventions which have been held in San Francisco since the fair opened, none has been more important than the International Engineering Congress, which finished its labours on the 25th of September.

"This Congress is the third of its kind to be held in America, the others being in Chicago in 1893 and St. Louis in 1904.

"It is safe to say that no previous Congress has been more successful in carrying out the work for which it was organized. Of course, the European war robbed the Congress of much of its international character, but a good number of delegates from foreign states were in attendance and the papers were from all countries.

"Following the formal opening ceremonies, and a general session dealing with Panama Canal subjects, the Congress split into sections, each discussing a certain assigned subject.

"Owing to the great mass of matter to be handled, most of the papers were presented in abstract, or in certain cases by title only. Discussion was invited, but as a rule there was little verbal discussion, as those who wished to discuss any paper usually put their remarks in writing.

"The section dealing with waterways and irrigation was probably the best attended of any, with the possible exception of Mechanical Engineering. This section held eight sessions, of which four were devoted to irrigation, at which sixteen papers were presented. Most of the papers were read in abstract, but a few were considered of sufficiently wide interest to be read in full. One of these was a paper by Mr. J. S. Dennis, H. B. Muckleston and R. S. Stockton on Distribution System Methods and Appliances in Irrigation. This paper called out a pretty lively discussion."

Reporting the Congress, Engineering News says:

"It is doubtful if there has ever been in the history of engineering a better symposium of irrigation work than these papers furnish. The number of leading irrigation engineers present at the Congress made the discussions active and profitable. Several of the papers described foreign practice in irrigation, in Italy, Spain and the Argentine Republic. It is noteworthy that the uniform report from all these countries was that the investments in large works for the storage and distribution of water had almost invariably proved unprofitable. The experience in these countries and in the successful irrigation work in Canada and Australia showed that the irrigation farmer must be given financial aid to prepare his land for irrigation or it will be impossible to rapidly colonize irrigation projects with permanent settlers."

Of the other sections, that on Material of Engineering Construction, while not very well attended as a rule, sometimes brought out a good crowd, and a lively discussion for some particular paper. A very interesting paper for the irrigation engineer, especially in Western America, was on the probable and presumptive life of concrete structures. This paper drew out a keen discussion, principally on the effects of alkali water on concrete and the cure or prevention of their effects.

In addition to the technical features, the Congress had its social side. A reception in the Palace Hotel on the opening night, and a banquet on the 24th, were the principal formal events, but in addition there were many informal enter-

tainment for the ladies who accompanied the delegates. There were also a number of excursions to points of technical interest in and around the city.

21st January, 1915.

His Worship Mayor Costello,
City Hall,
Calgary.

Dear Sir,—

Re Retail Butchers' Petition.

I am instructed by the President of this Association (The Honourable Duncan Marshall) to energetically protest to the City Council against any increase of the present charge of $1.00 levied upon farmers retailing meat in the City Market.

I cannot conceive that the City Council would wish to lay a burden on the farmer, who should be encouraged to use the markets of the city, particularly when it is becoming more apparent every day that the successful expansion of this city depends in a large measure upon the development of the farming community in its immediate environment.

Yours truly,

(Signed) NORMAN S. RANKIN, *Secretary.*

January 22nd, 1915.

Norman S. Rankin, Esq.
Secretary, Western Canada Irrigation Association,
City.

Dear Sir,—

I beg to acknowledge receipt of your communication of January 21st, relating to the raising of the fee charged butchers, from $1.00 to $50.00. As this communication is one which relates to the Legislative Committee of the City Council, I am forwarding it to them for their consideration.

Yours truly,

(Signed) M. C. COSTELLO, *Mayor.*

January 21st, 1915.

Dear Madam,—

Relative to my telephone conversation with you yesterday, I take pleasure in attaching herewith copy of letter which I have this day forwarded to Mayor Costello in the matter of the petition of the local butchers for an increase to $50.00 of the present annual license made through the Public Market.

If this Association can co-operate with you any further in this matter, please let me hear from you.

Yours very truly,

NORMAN S. RANKIN, *Secretary.*

Mrs. Albert Fryling,
1713, 25th Street West,
Calgary, Alberta.

Calgary Consumers' League
1713 Twenty-fifth Street West, Calgary,

January 27th, 1915.

Mr. Norman Rankin, Sec. W.C.I.A., Calgary.

Dear Sir,—

Many thanks for your letter duly received.

We are very glad of your support at this time, and shall remember your kindly attitude if we need your assistance in the future.

Yours sincerely

M. FRYLING,
(Signed) p.p. M. E. B.,
President, Consumers' League.

January 21st, 1915.

Dear Sir,—

The attached letter sent to Mayor Costello to-day in protest against the retail butchers' petition for an increase in the market license from $1.00 to $50.00 for retailing meat, may be of interest to you and your readers.

You will note that this Association takes up the farmers' side of it only and makes no mention of the increased cost to the consumer that would result if such a petition goes through.

Yours very truly,

NORMAN S. RANKIN, *Secretary.*

W. M. Davidson, Esq.,
Editor, The Morning Albertan,
Calgary.

January 30th, 1915.

Dear Sir,—

The Consumers' League and public having been successful in defeating the butchers' demand that the farmer be excluded from the open market by increasing the license fee from $1.00 to $50.00, in which result this Association took some small part, I am this morning in receipt of a letter from President Fryling, one paragraph of which says, "We are very glad of your support at this time, and shall remember your kindly attitude if we need your assistance in the future."

I supplied you with clippings regarding this matter before it was settled, and with a further clipping giving the result.

Yours very truly,

NORMAN S. RANKIN, *Secretary.*

To the Executive.

NEW BUSINESS.

At a meeting of the Executive held in the Palliser Hotel, on October 7th, the matter of the issue of the annual report in separate papers to be sent out periodically to the farmers in place of the present form of report was discussed, Mr. Peters having written the Secretary about this matter on December 22nd, 1913. It was reported by the Secretary that 2,500 of these reports had been published last year, and that there had been a call for 500 additional. Superintendent Drake said this publication cost $1,400, and pointed out that it had been elaborated upon each year, printed on very fine quality of paper, highly illus-

trated, and that he was of the opinion that it would be a mistake to vary the form to any appreciable extent. The Secretary reported that he had no less than 4,000 names on the mailing list now, and after considerable discussion it was moved by Wm. Young and seconded by A. Chamberlain, that in view of the present financial situation the report be proceeded with in the usual form and that the matter be again discussed next year.

It was moved by Mr. Walter Huckvale and seconded by Mr. Peters, that in order to fall in as much as possible with Mr. Peters' suggestion and to get these individual reports in the hands of the farmers to the greatest possible extent, the Secretary be requested to secure publication of the various papers in the weekly and daily press. CARRIED.

As will be seen by the following correspondence and the clipping books, the matter was duly put into effect.

October 23, 1914.

Dear Mr. Drake,—

I am sending you by express the Eighth Annual Report of the Western Canada Irrigation Association, held at Penticton, which has been edited and is absolutely ready as it stands for the printers. In fact, the copy might be called a "dummy." It consists of 294 pages typewritten matter, which, of course, includes the pages extracted from the Tentative Programme.

Reverting to the subject of our conversation at the luncheon held in the Palliser on October 6th, the papers which were specially desired to be printed separately were those of Dr. Rutherford and Don H. Bark, both of which, however, I can have widely circulated in the weekly press. I already have McMullen's "Live Stock on an Irrigated Farm" running, and hope as it goes on to put the majority of them out in this way. I hope that you will be able to run 3,000 copies this year, and that this may reach your printers at a time when they can devote early attention to it, so that we may get it in the hands of our delegates (1,500) before the New Year.

I take this opportunity to thank you for the telegram sent me from the Dry Farming Congress, which we gave wide circulation to here. Your wire was the first news that had been received in the West of the winning of the Sweepstakes by Canada. For your information I wish to advise that the 1915 Bassano Convention will be held some time between November 15th and December 15th.

I enclose in the parcel also 53 photographs for illustrating the report, and will be obliged if you will choose those which you think best adapted to the report. You will note that Professor Adams has sent nine special photographs to illustrate his lantern talk, which are mounted on special yellow paper.

Yours very truly,

NORMAN S. RANKIN, *Secretary.*

E. F. Drake, Esq.,
Superintendent of Irrigation,
Department of the Interior,
Ottawa, Canada.

Department of the Interior, Canada,
Irrigation Branch.
Ottawa, January 15, 1915.

Dear Sir,—

I have forwarded to you, separately, 1,300 copies of the address delivered by Mr. Don H. Bark at the Eighth Annual Convention of the Western Canada

Irrigation Association, at Penticton, B.C., in August last, and am enclosing one copy herewith. They will be followed by Mr. S. G. Porter's address on "The Practical Operation of Irrigation Works."

I have retained 200 copies of the pamphlet for other distribution, either directly from this office or through the office of the Commissioner of Irrigation, at Calgary. I trust that you will find the supply sent you sufficient for your purpose.

Yours very truly,

(Signed) E. F. DRAKE, *Superintendent of Irrigation.*

Norman Rankin, Esq.,
Secretary,
Western Canada Irrigation Association,
P.O. Box 1317, Calgary, Alberta.

Department of the Interior, Canada,
Irrigation Branch.

Ottawa, January 19, 1915.

Dear Sir,—

I have forwarded to you, separately, 1,300 copies of the address delivered by Dr. J. G. Rutherford at the Eighth Annual Convention of the Western Canada Irrigation Association, at Penticton, B.C., in August last, and am enclosing one copy herewith.

I have retained 200 copies of the pamphlet for other distribution, either directly from this office or through the office of the Commission of Irrigation, at Calgary. I trust that you will find the supply sent you sufficient for your purpose.

Yours very truly,

(Signed) E. F. DRAKE, *Superintendent of Irrigation.*

Norman Rankin, Esq.,
Secretary,
Western Canada Irrigation Association,
P.O. Box 1317, Calgary, Alberta.

January 19th, 1915.

Dear Sir,—

I am obliged for your letter of the 15th inst., and for the 1,300 copies of Don H. Bark's address which you have published so neatly.

These are going out at once to 1,300 farmers in the irrigation districts other than delegates of the Association, who will receive this pamphlet as part of the Annual Report. When may I expect the Report, by the way?

Let me express the Association's thanks for your good offices in this matter.

Yours very truly,

NORMAN S. RANKIN, *Secretary.*

E. F. Drake, Esq.
Superintendent of Irrigation,
Department of the Interior,
Ottawa, Ontario.

January 25th, 1915.

Dear Sir,—

I hand you herewith a copy of a pamphlet issued by the Department of the Interior, Irrigation Branch, at Ottawa, containing a speech by Dr. J. G. Rutherford, made before the Eighth Annual Convention of the Western Canada Irrigation Association at Penticton. This address is being sent to 2,500 farmers in the irrigated districts of the province.

This Association is following up this plan by similar action in connection with a speech by Mr. Don H. Bark, of Boise, Idaho, on "The Actual Problem that Confronts the Irrigator," and that of Mr. S. G. Porter on "The Practical Operation of Irrigation Works," and will from time to time repeat it, and in some small measure encourage the irrigator to greater success.

Yours very truly,

NORMAN S. RANKIN, *Secretary.*

Editor, The Herald, Calgary.
Editor, The News-Telegram, Calgary.
Editor, The Albertan, Calgary.

FINANCIAL STATEMENT WESTERN CANADA IRRIGATION ASSOCIATION, 1914-1915

August 7th, 1914, to November, 1915

RECEIPTS

1914—Balance carried forward as per bank account		$1,075.84
1915—Dominion Government Grant		500.00
Alberta Government Grant		500.00
Private Grants:		
Dr. J. G. Rutherford	$500.00	
Canadian Development Co. (C. W. Peterson)	50.00	
George Lane	25.00	
Dominion Farming Co. (F. W. Crandall)	10.00	
		585.00

EXPENDITURES

1914—Expenses, Transportation, hotels, etc., speakers Penticton from U.S. points	$256.45	
Stenographic Report and Expenses of all stenographic work	245.00	
Grant to Secretary	200.00	
Transportation and Expenses Members of Executive attending International Irrigation Congress at Calgary	66.00	
Secretary's Salary for 5 months	208.30	
1915—Printing Letterheads, Official Calls, Badges, Photos, Cuts, Folders, Postcards, Station Hangers, Convention Hall Decorations, etc.	543.60	
Expense Delegates (3) to Oregon Irrigation Congress, Portland	14.66	
Secretary's Salary for 10 months	416.60	
Balance in bank	710.23	
	$2,660.84	$2,660.84

Certified correct,

NORMAN S. RANKIN, *Permanent Secretary.*

NOTE.—No grant was received this year from British Columbia, who have been very generous in the past. The Secretary therefore solicited the private grants above stated. $250.00 of the balance alone will go to the prize list of the Soil Products Exposition.

GOVERNMENT GRANTS

The Association is indebted to the Dominion Government for a renewal of their grant of $500 and to the Alberta Government for the same amount. British Columbia made no grant this year. Dr. J. G. Rutherford, upon request of your Secretary, came forward with $500. Towards the prize list for the Exposition of Soil Products, donations were made by The Canadian Development Co., $50; George Lane, $25; and The Dominion Farming Co., $10.

The Exposition of Soil Products, while being laid out on the most economical basis, will consume not less than $500, the prize list alone being $250. Full details of all expenditures in connection with this exposition will come before the delegates in a subsequent report.

Below is a statement of the cost of the Penticton Convention, which, of course, does not include working expenses for the period between conventions, delegations, office operation, stamps, executive meetings, etc.

Transportation, expenses of 4 speakers, including Secretary and assistant	$322.95
Stenographer's report, including hotel and expenses	220.00
Grant expended by Local Board of Control	500.00
Printing, Badges, Cuts, Photographs, Engraving, etc., incurred at Calgary	269.75
Expenses of two meetings of Programme Committee (4 members) at Sicamous	105.70
Total	$1,418.40

The cost of the Kelowna Convention in 1912 was $1,615.95, and of the Lethbridge Convention the following year $1,514.64. Of necessity, the cost of the Bassano Convention will be reduced by some $500.

During the year we lost from our Executive two members who joined the Overseas Forces—Captain J. C. Dufresne, of Penticton, went into camp early in the year, and Mr. Arthur Chamberlain, of Kamloops, joined the Coast Artillery in July: These gentlemen were replaced, the former by Mr. F. Maurice Smith, of Penticton; the latter by Mr. C. E. Lawrence, President of the Farmers' Institute of Kamloops. The Association will follow with interest the work of these two men in the field, and unite in good wishes for their safe return after the war is concluded.

MR. RANKIN: If any person desires any further information on this report I will be glad to submit to them my report on any subject.

CHAIRMAN: We have with us to-day the President of the South Alberta Patriotic Fund, and I believe he desires to say a few words on behalf of that fund.

MR. T. M. TWEEDIE, M.L.A., addressed the Convention on the aims and objects of the South Alberta Patriotic Fund, and set out very clearly the good work being done by that fund.

CHAIRMAN: Now we are going to have a few words from the different provinces represented in this Convention, beginning with the province of British Columbia, we shall have a few words from the Honourable Senator Bostock.

SENATOR BOSTOCK: Your Honour, Mr. Chairman, Ladies and Gentlemen,—When I started out to come to this Convention I came with the idea that I would come as a worker. One who has been irrigating for some twenty-eight or thirty years, but when I got here I was told that the Honourable Mr. Ross was unable to attend and I was asked to say a few words in his stead.

I want to say first that Mr. Ross regrets very much not being able to attend this Convention. He takes a great interest in this province as Minister of Agriculture and also as member for the constituency of Fernie, which is the constituency adjoining Alberta, and he is perhaps more in touch with the irrigation question in this province than others of us. A great deal of the land in our province is of no value unless you irrigate it. It has been said that British Columbia is covered with seas of mountains, but I think people realize that between those seas is land very valuable, and especially where you can put water on it you can raise crops and get very fine returns from it. Those who have been interested in irrigation for a great many years realize that there is always something to learn, and it is a great benefit to people who have studied irrigation to come to this Convention to exchange ideas and get fresh ideas from those who have been carrying out irrigation in other parts of the world.

The part of British Columbia that I came from is on the main line of the Canadian Pacific Railway near Kamloops, and is, I suppose, the part that has been irrigated land for farm purposes for a longer period than any other part of the Dominion of Canada. There is a great quantity of water in that part of the province. The only question is the storage of water in the season it is not required to be put on the land, and carrying off that water for utilizing it when crops most need it. These are most difficult to deal with because in British Columbia we started to record water for the same purpose, as we thought, as for the purpose of mining. The original records of water for irrigation were granted for the purpose of sluicing the ground and getting the gold from the ground, and consequently we got into a system of measuring our water by what is known as miner's inches, and most of the people of British Columbia think of water in miner's inches, but when you come down to deal with the measuring of water for farming purposes you deal with it in the number of feet of water you can put on an acre of land and, therefore, a number of us who have been irrigating for a number of years have had to change our ideas on this subject.

When I first bought my place in British Columbia, I was very much taken with the soil and the climate, and with the fact that it was on the main line of the Canadian Pacific Railway, but I found that as far as irrigation was con-

cerned there was a great deal to be learned and that irrigation was not nearly as easy a subject as I thought when I first started. When I bought the place there was a large number of ditches on it, and it seemed a very easy thing to put water on the land and then to sit down and watch the crops growing, but the first thing I found out afterwards was that although there were lots of water to put on the land, to grow successful crops you have to start in to cultivate it and the less water you use on the land, the bigger the crops and better, and the more cultivation you do, the better it will be in every way, and I found it was not a lazy man's work. The great beauty of being able to irrigate land is that you are certain of a crop every year. If you have the sunshine and can get the water, you are in a position of being certain of your return at the end of the season.

A great deal has been said about dry farming in different parts of the country, and I think the methods of dry farming are very good, and as education in agriculture proceeds, a great number of the methods of dry farming can be applied by the man who is irrigating, but, at the same time, I would prefer being in a district where I can get the water and irrigate the land. Then I would be certain of raising a crop at the end of the season.

I do not want to take up much of your time. It gives me great pleasure to be here, and I will listen with very great interest to the discussions that are carried on. (Applause.)

CHAIRMAN: The next province in order is the province of Alberta, and we will have a few remarks from the representative of this constituency, the Honourable C. R. Mitchell.

HON. C. R. MITCHELL: Your Honour, Mr. President, Ladies and Gentlemen,—I think so far as the province of Alberta is concerned; so far as the speech making is concerned, it has been done justice to already. We have our President, Mr. Marshall, who is Minister of Agriculture and Chairman to-day, and I think by the time this Convention is concluded it is probable that Alberta will have been made pretty well known to the other provinces and visitors from the other side of the line. Consequently, it will not be necessary for me to say very much on this occasion, except by way of welcoming you to the constituency of Bow Valley, which I happen to represent.

I have been travelling up and down the line of the Canadian Pacific Railway for something over fifteen years, and like many other people who have gone over that line from time to time, but particularly in the early days, I have made the remark and wondered when this great stretch of country, two hundred and fifty miles east and west by something like seventy or eighty miles north and south, would be settled. We have all asked ourselves that question, and we have all looked forward to the day when that would be an accomplished fact.

With respect to a very great portion of that area of land, I personally do not think that we can look forward to any very intense settlement unless the object which this Convention has in view, the object of irrigation, can be made a success, and it cannot be made a success unless an organization of this kind takes

hold of and keeps working with that end in view. Personally, I am not acquainted with the methods of irrigation. I only know that irrigation accomplishes great results in a country where a little more moisture is needed than is usually given to it through nature. This is a great province, the province of Alberta, and I think it has more varied conditions of soil and climate than any other individual province in the Dominion of Canada. I once heard a member of the Legislature of the province of Alberta facetiously remark that in northern Alberta the problem was to get the water off the land and in the southern part of the province the problem was to get the water on to the land, and so we can accommodate the man who wants to farm in the ordinary way or the man who wants to go into it scientifically and bend his energies along the lines of irrigation. However, on an occasion of this kind one can only feel that as a result of the labours of this organization as they will put them forward from time to time, they will devote their energies to developing a country that has not been developed. In this constituency of Bow Valley stretching one hundred miles east and west, there are very few townships not yet under settlement. Years ago, when the Canadian Pacific Railway undertook to acquire a certain amount of land of continuous area to carry on a scheme of this kind, the statement was made that with irrigation this country could be made a great centre of population and would blossom forth as the rose. That was some years ago, and though years have gone by, and although the country has blossomed like a rose in spots where water has been put on the land, we are still without our intense settlement. No one is to blame for it. Conditions are such that development with irrigation has been an uphill fight and has been for one of the wealthiest corporations in the country. If it has been an uphill fight for them, some of the farmers must expect to make success slowly, and I am here to create an interest in this work and also to endeavour to create an interest amongst the people of this district in this work, because I believe that we, as public men, must do everything possible to further the interests of irrigation in this country. We know that this country is capable of immense development, but, without irrigation, its progress will be very slow.

I have very much pleasure in coming here to see so many delegates from the country immediately around us, and also from outside points.

I hope your labours will be crowned with success. I hope you will continue to grow year after year in strength and develop the cause of irrigation so that before long we can make more rapid progress in it than has been made in the past. And when I say that, I am casting no reflections on those who have had charge of this work. All honor is due to these men. They have, perhaps, faced more difficulties in the problem of irrigation in this country than any other men have had to contend with. There are those who think irrigation is not the right thing. They say this is not the right climate and you cannot grow grain under irrigation; that irrigation can only be applied to fruit and so on. I have heard many objections and have endeavoured to inform myself from the public press as to the demerits and the merits of the different phases of this work, and I have come to the conclusion after many years of residence in this country, and knowing its climatic conditions as I do, and hearing of the

soil conditions, and seeing what can be done by putting water on the land, and seeing places where water is already on the land, I have come to the conclusion that if we are to have the population and intensified farming which we all hope for, we can only have it by the development of the irrigation idea, and the thanks of the people of this country should be given to those who are working in and out of season for this great cause.

I thank you, Mr. Chairman, for giving me an opportunity of saying a few words at this Convention. (Applause.)

CHAIRMAN: We had hoped to have with us Mr. Motherwell, but he has been detained and has sent us his representative, Mr. Domaile, of his department. You will note from his manner of dress that he has decided to reverse the ordinary nature of things and beat his ploughshare into a sword.

MR. DOMAILE: Your Honour, Mr. Chairman, Ladies and Gentlemen,—I must take exception to what your Chairman has said. I have beat my ploughshare into a sword and have been over there and back again. Unfortunately I have been over there, and I would much sooner face the Germans and German shells than face an audience like this, because, unfortunately, I am still very nervous, extremely nervous, and I wish to state that I am extremely sorry, and the Minister of Agriculture for Saskatchewan is extremely sorry, that he has not been amongst us to talk; he wished me to state his regrets and say that they were having a live stock commission, as we found it very hard to dispose of live stock in Saskatchewan as we wished, and he had promised to be there. He asked me to convey his best wishes and to say he expects and hopes to be with you next year.

I take this opportunity on behalf of myself and the Saskatchewan delegates of thanking the Mayor for his welcome to us to Bassano, and also to Mr. Rankin and the Convention for allowing the Saskatchewan exhibits to be shown. I am afraid I have bothered them a great deal with correspondence.

I know nothing of irrigation outside of watering my back garden with a bucket. I came to learn and am very pleased that Saskatchewan has been able to compete with an exhibit of crops grown under dry farming conditions and comparing them with crops grown under irrigation conditions. At the dry farming convention we achieved some success, and we naturally are proud of it and have been getting sixty bushels of wheat to the acre in Saskatchewan, and it seemed superfluous to irrigate, so we patted ourselves on the back and said irrigation is not necessary. Many people, I think, thought on these lines, but I think a great many thousands of people of the province think that it would be a great advantage to ensure our crops in the dry years. As you know, southern Saskatchewan had a very poor crop last year, but how Saskatchewan is to have water to improve the crops I don't know, as all the streams come from Alberta, and Alberta will most likely take all the water she requires first. However, Saskatchewan has had a great crop this year and is helping the Empire in this time of war when wheat is more useful than men or money perhaps, more important than money, at any rate.

I want to talk a little about the thorn in the flesh. Mr. Motherwell said that he had a loss of twenty-five millions of dollars through weeds. Now that is a conservative estimate. We lost fifty millions through the weeds in the province, and when I am going around there it reminds me of the front. I saw the thistle and tumble weed flying like aeroplanes across the country. I spoke to the farmer about it and I said, "You will have weeds next year." He said. "Oh, no, only a few." I came around the next year and saw them again, and I said, "You will have some weeds." He said, "Oh, no; we will get after them after a while." In four or five years you will find those weeds entrenched there. The sow thistle, the Canadian thistle, and barb wire entanglements of Russian thistle, and you go to the farmers then and he says it is too late. The wild oat is living off the country the same as Germany is living off Belgium. The farmer will not move. He cannot move. They have beaten him and beaten him completely. Looking around it seems impossible to do anything. You had a speaker just now whose subject I very much admired, who cut the ground from under my feet. He referred to the weed problem and as to weed education. It seems to me we ought to get the bankers with us in this matter and the credit men with the farmers, because the educational problem affects everyone. The war taking place in Europe affects every person. The man, the woman and the child. The monied interests are affected. Everyone is affected, and so with the weed problem which faces us in this province, everyone is affected. The weeds in one district have cut down the credit one-half, and everyone will have to enter into this fight and we will have to start. I am glad to see how Alberta has started with rural education, but I am afraid Saskatchewan is behind in this matter, and I hate to admit that Saskatchewan is behind Alberta. Next year we hope to start something definite.

On the other side, I was struck with rural education. The war did not interest me very much, but I was interested in rural conditions. I was never very much on fighting. I remember I picked up a school book in an old school which had been blown to pieces by shells, and there I found a first reader in French, and one sentence which struck me was, "My father has a good horse. His horse is good because his back is short. The horse is good because his feet are sound." Here you begin with a primer and you read what? "The cat is on the mat. The mat is by the fire." (Laughter.) Now I hope we will get over this sort of thing. I took it up with the few people I could interest in these things, and I found I had a set of readers at home. They lead up from the primary reader until in the sixth grade they are doing work that pupils are doing in taking a course in the Saskatchewan University. I just mean that the standard of education is very high in Belgium and you can pick up any book used in a rural school and everything is leading up from agriculture. Here in Saskatchewan they have taken, as far as I could follow, the education that was suitable for the urban population and they have sorted it out and sifted it out and given it to the rural child and removed the child from his surroundings and put him in this town atmosphere and told him that was the breath of life and the only thing that was any good. If we do not get away from it we will have nothing in the home at all. The country is the only place where we can

raise a healthy population. You know if you live in a city for a generation the population dies out.

Over in Saskatchewan, in connection with my particular work, I considered this a national problem. We are giving grants to various associations for different clubs, potato clubs, the clubs for identifying weeds, poultry clubs and clubs connected with domestic science. If a boy has grown half an acre of wheat and off that half acre is produced as much as his father produced on an acre, that boy has learned a lesson he will never forget. On that half an acre a boy has seen a lot of the elimination of weeds, the conservation of moisture and everything that goes to build up a crop, and when he grows up he will take those lessons to heart, and when he is a farmer he will grow these crops I have been talking about, and he will have no weeds, and when we get that class of farmers we will get the farmer that knows how to grow a crop. In Belgium I saw fields that had not been cultivated for eighteen months and barring a little chick weed there were no weeds at all on those fields. The farmers there—their cattle had been driven away, perhaps some of these farms were only a couple of miles from the firing line—and yet they were already planning out what they will do and what crops they will grow. They had everything planned out to go ahead again. Why they planned and how they planned is because they had been educated in the rural school or colleges, your equivalent to collegiate institutes, and have been educated in the agricultural colleges.

Before I close this subject I want to say a few words about something else. The Red Cross has a great many things at the front. Every time you went anywhere you would find the Red Cross, and when I was wounded I think the thing I appreciated most was when a Red Cross nurse came up to me and handed me a cup of tea and I was able to put sugar and milk in my tea. Unless you give what you should give, those things at the front cannot be continued, and when I see a body like this it makes me feel like I did in England where I went around for a month recruiting. They had a poster, in the centre of which was a pond, or slough as we call them, and in the centre of the pond there were two hands raised and you could see that they were the hands of some man sinking under the water for the last time, and in the shallow water was a great, strong, healthy fellow just landing who displayed no sign of any sort of fatigue. That was the so-called "friend" who was deserting the man in the centre of the pond. He was allowing him to sink.

Amongst the audience here there is not a single one of you who would call a creature a man who would let a friend sink or even a person who was not a friend. Many of our fellows have gone to the front, and any of you who are able to enlist and do not are in the same class as the man who will not enlist, and any who will not give his last cent for the man at the front who is doing his best, is in the same category as the man in the poster letting the man sink. (Loud applause.)

CHAIRMAN: I have very much pleasure in now calling upon the man who has had most to do with irrigation in this province. He is also Vice-President of the Irrigation Association, Mr. J. S. Dennis. (Applause.)

MR. DENNIS: Your Honour, Ladies and Gentlemen,—I must first express my pleasure at being able to attend an irrigation convention in Bassano. I have both the pleasure and misfortune of being one of the cranks who must assume responsibility for irrigation in this part of Alberta, and, therefore, it affords me great pleasure to attend a convention in Bassano which is ostensibly called for furthering the introduction of the system or irrigation which is looked upon and by a great many people as the result of the efforts of numerous cranks like myself.

I assume I can say, Mr. Chairman, that we have now got to the stage with the system of irrigation in the southern part of Alberta that we have passed beyond the experimental stage. There is invested in the southern part of the province in works designed to bring water to the land, a sum of $25,000,000. The Canadian Pacific Railway has invested with this scheme, and in the Lethbridge district, practically $20,000,000. It is not reasonable to suppose that this amount of money would be invested on the basis of a poker game, although to a great many people it would seem that it was going into a jack pot in which there was not a jack. However, the money is here; the work is here. Now the problem is to get the people and prove that the application of the water to the soil through the principle of irrigation will produce results. It seems in a sense unnecessary at a meeting like this or at any meeting where the subject of irrigation is under discussion, to try to prove that the application of water to the soil is necessary. We are very proud of the wonderful crops produced in Alberta this year and are all very proud of the southern part of the province that it stands at the top in the quantity of the crop it produced.

Why did we produce a crop in Alberta, Saskatchewan and Manitoba? Simply because nature was good enough to associate climate and soil with water and gave us what we got. Without the moisture we could not have had it. Without the snow we could not have had it. Without the soil we could not have had it. But the combination of the three produced it.

It may interest you to know that while irrigation has been introduced into Alberta to ensure a crop every year, never in the history of Alberta have we had in five years a continuous crop. If any of you will go over the Government records you will find that we have never had a continuous period of four years within which there was a sufficient amount of rain to ensure a crop. We have had a series of periods in which you will find two of moisture and three of drought, which is about the average. Within the last seven years we have had four years of sufficient moisture to produce crops, and the introduction of irrigation was simply to overcome the loss of the crop for the one year in five. That is why it was done and what we expect to do in the end, and one of the favourable features is that mistakes have been made and may yet be made. The problem can only be solved at meetings of this kind where people get together and discuss the matter from all standpoints and exchange ideas and endeavour to overcome difficulties which have arisen, and by all putting their shoulders to the wheel to accomplish something. Therefore, it affords me great pleasure to be at a meeting in Bassano called for the purpose of discussing this great problem and endeavouring to find a means by which irrigation can be extended in this

district and ultimately bring about what Mr. Mitchell referred to and which I am now satisfied will come; that this district east of Calgary and comprising this great area more or less unsettled it is true (but when we began to work it was unsettled), but when settled it will become the most densely settled district in Western Canada. I said that some years ago and will go on saying it. Let us see what has happened since I began to pose as a prophet. When we began our work there was absolutely nothing between Calgary and Medicine Hat. I remember when I first started to make surveys for the Government to see if water could be got out of the river. There had been settlers, but they had gone. There was a little settlement at Gleichen. Established why? Not because it was a centre of agriculture, but because the Canadian Pacific Railway had established it as a terminal. That is not a great many years ago as time goes in the development of a new country. It is practically only ten years ago. If you go to Brooks and follow that line west to Calgary or from Gleichen take the trouble to go north or south until you come to Calgary, I claim that you will find something for the foundation of the prophecy I have made, in saying that in time this will be the most closely settled district in Western Canada, and I believed it when I said it first, and I believe it more now. The introduction of irrigation is what did it, and the permanent study of irrigation is what will establish it.

Of course, as I have stated on many occasions, we have had trouble with irrigation and will continue to have it. No great progress was ever made and carried out without trouble. We have tried to meet our troubles in a fair way and they are being met and possibly are gradually reaching a point where all are putting their shoulders to the wheel and working up this great problem together.

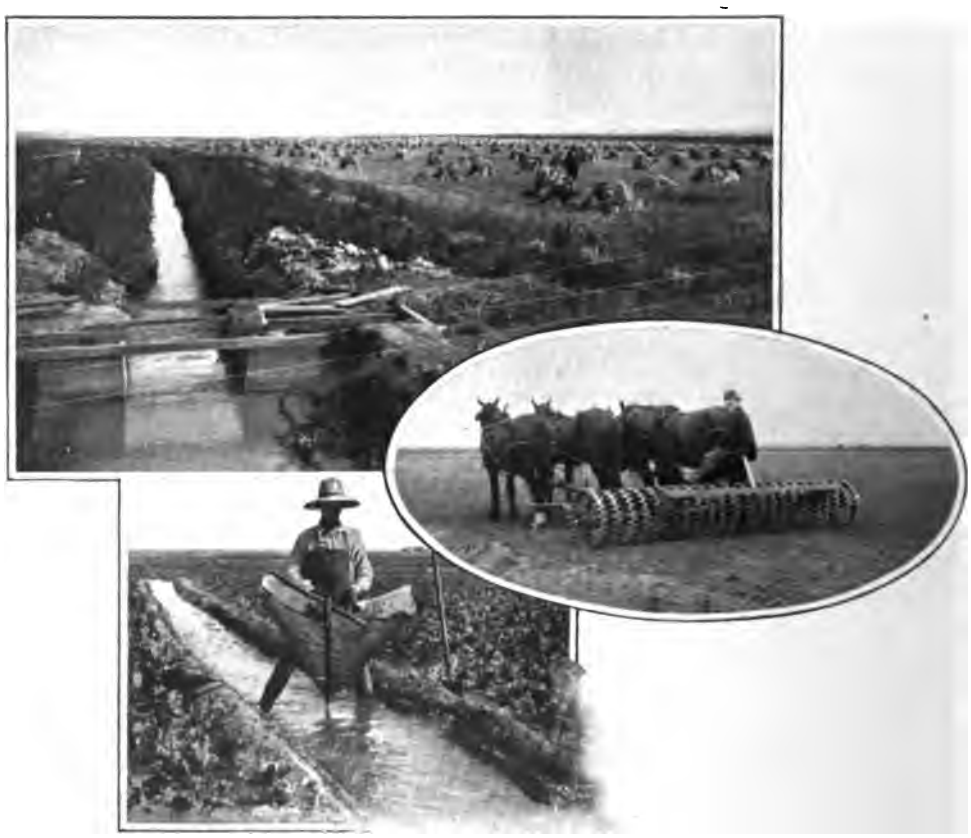
The Minister of Agriculture—our Chairman—has spoken to you of the necessity for more agricultural education or more education along the line of keeping people on the farm. As he properly points out, it is the problem of getting people on the land and keeping them there. It is a problem in which everybody must take a hand. It is a many-sided problem and it is one that is going to require the combined effort of everybody if we are to arrive at a solution. We need more than anything else in Western Canada, and in this province particularly, the people on the land. Remember, I am not speaking of settlers. We have a lot there now. What I mean is we need farmers. I am distinguishing between people who settle on lands to get rich quick and move on, and the man who goes on the land and stays there and brings up children and gives them a taste in their mouth that they want to stay on the land. We are lamentably short of that class of people. We must strive to increase their number. It is a very difficult matter for us to go outside and induce immigration into Western Canada. We have to mark time until this great conflict in this Empire is over. But, we have to lay the foundation which will enable us to go out and invite the people of the world to throw in their lots with us because during this great violence we have done our part in showing what irrigation will do for the country, and also by contributing with men in the fight and doing our share at home in looking after those men and their dependents and creating that condition that we can go out after the violence and say we want you to come and throw in your lot with us in Western Canada, which is not only a crop-pro-

ducing country of grain and cattle and men, but we have also proved is one that no man need be ashamed to say, "I come from Western Canada. I am a man of Western Canada." I hold up to the world that Western Canada has done her share in providing over fifty per cent. of the men that have gone to the front from Canada and by doing her share in the work Mr. Tweedie has spoken of and by providing Red Cross nurses and the means for men who have come back from the front and who have done our share over there, and by doing everything in our means to make us proud that we *are* men of Western Canada. (Loud applause.)

CHAIRMAN: We have on the boundary line of Alberta and Saskatchewan an irrigation association that has done a lot of practical work in irrigation. We have the president of that association with us, and I hope to have a few words from him now.

SECRETARY: Mr. Hargrave is not yet here.

CHAIRMAN: The members of the Resolution Committee are as follows: Messrs. William Pearce, Hargrave, Speakman, Scott and Marshall.



(Upper View) L. N. Lavenden's Farm, Standard. (Centre) Packing on Freiburger's Farm, Gem. (Lower) Irrigating Sugar Beets, Bassano Colony.

The members of the Credential Committee are: Messrs. Fairfield, Brown and Abbott.

There is only one person more troublesome than a book agent, and that is a photographer, and there is one laying in wait for us down in front now. The photograph is to be taken in front of the exhibition building.

SECRETARY: I would just like to announce that all delegates who have not yet registered should register, and those who have standard certificates should present them on the way out. We have a telegraph office in the building if anybody desires to use it; it is here on the left.

CHAIRMAN: The formal opening of the Exposition Hall by His Honour the Lieutenant-Governor will take place immediately upon the adjournment of this meeting. It is only a couple of doors from here. I now declare this meeting adjourned until 2 o'clock this afternoon.

AFTERNOON SESSION, NOVEMBER 23, 1915

CHAIRMAN: We have with us the President of the largest organized body of farmers in our province, namely, the President of the United Farmers of Alberta, and I have pleasure in introducing to you Mr. James Speakman.

MR. SPEAKMAN: Mr. Chairman, Ladies and Gentlemen,—You will have to blame your worthy Secretary, Mr. Rankin, for my presence here this afternoon, and especially you have to blame him if any blame does accrue for my being guilty of giving an address.

I have been immensely interested this morning and not only in the meeting but also in private conversations I have already had with several friends that are sitting here; that has somewhat cleared my mind in some matters, and I want to say that it is a difficult matter for a man to preside, as it were, over a big mixed diocese, if I may call it, as Alberta is. All kinds of differences of opinion; all kinds of differences of interests. There is one thing that has grown stronger in me this morning, and that is the conviction that I already had, that in our province irrigation when rightly applied is one of the most important things and one of the best things we can have, and in that respect, as I said to Mr. Dennis a little while ago, I agree with almost every word he said.

At the same time it looks to me, if we want to promote irrigation rightly, we must not ignore difficulties and disputes that have arisen. We will only deal with them rightly by facing them and trying to wipe them out.

One of my biggest worries this year is the irrigation dispute that has arisen in the Gleichen district, and for some of us who have been connected with it. I propose to deal shortly and quietly with it, and as impartially as I can, and in order not to make any rash words of any kind, I have departed from my usual custom, and will read what I have to say on this matter.

Your Secretary at a previous convention complained of the absence of farmers from the convention; he thought that conventions were comparatively a failure when the men practically and vitally interested in the questions discussed were conspicuous by their absence, and I have been trying to discover the reason for this by studying the reports of the previous conventions. It seemed to me that there was a sense of unreality in those conventions. The discussions, apart from questions of legislation, hardly seemed to grapple very closely with irrigation as applicable under the conditions of the irrigaton districts in our own country, at any rate so far as Alberta is concerned. I don't want to add to this unreality by delivering a merely ornamental address, and I was very doubtful about speaking here at all. I have no personal experience in irrigating, though during my nearly twenty-five years of farming in Alberta, I have often wished that I could turn water on to my land when the crops were languishing for want of rain. The field we survey at this convention is an immense one. I know very little of British Columbia beyond the fact that in almost every direction conditions there are entirely different from Alberta and Saskatchewan. In Alberta I know a little of the irrigation work in the Lethbridge district, and I have made a considerable study of the matter in the Western Irrigation Block east of Calgary. These are the only districts in which I know anything of the practical working of irrigation. I am struck with the different results in the two districts. In the Gleichen and Strathmore districts there is almost unanimous discouragement and dissatisfaction. In the Lethbridge district there is, so far as I have seen or heard, great confidence, and even enthusiasm. I don't think I have anywhere seen such splendid results in alfalfa, timothy and mixed fodders as around Lethbridge. I think that for rotation of crops of alfalfa, grain and possibly roots, irrigation in the Lethbridge district rightly applied is an assured enrichment of the country. Of course, the basis of it all must be the live stock business.

The shipping out of alfalfa and hay, where the transportation charges are so large in proportion to the value of the goods shipped, seems to me a very wasteful process.

I know that some of my Lethbridge friends are dreaming of very large new irrigation projects. The difficulties that have arisen elsewhere will, of course, cause these new projects to be very carefully scrutinized, but there is one general objection to them which I hear uttered sometimes, with which I don't agree. It is said we have in this immense province innumerable acres of fertile land which will yield good crops without irrigation, let us get them settled first before investing capital in irrigation schemes. That sounds plausible, but there is another side to that question. Immense capital has been invested in railways in districts which as yet are scantily cultivated. If some capital invested in irrigation results in more fully utilizing existing railways, it will be a better paying proposition than to continue spreading out a thin skin of population, calling for new railways in new districts yielding scanty returns.

I come to the question of the difference in results between Lethbridge and Gleichen-Strathmore. The trouble in the Western Irrigation Block is so serious

that I think this convention might well help to find a solution, for certainly this trouble is hindering and casting suspicion on irrigation projects everywhere in Alberta. We may as well dismiss at once the theory that this trouble is caused by a few disgruntled agitators. That is simply untrue. As Mr. Drake pointed out in the Lethbridge convention two years ago, it is a numerous body of water users that is discontented. Nor is it true that the trouble arises from the incompetence of the farmers. There are some incompetent men on these farms, but that is owing, as Prof. Elliott suggested in 1913, to the indiscriminate way in which all kinds of settlers were induced to buy these farms, a number being townspeople from Great Britain who knew nothing even of the simplest forms of farming, and were utterly helpless before the problems of the highly technical irrigation farming. I may say, so that I may not be misunderstood, that I don't want it to be supposed I am casting any slurs on town people from the Old Country. Twenty-five years ago I was one of those greenhorns and I settled on a farm in a place it would be hard to find the equal of in any part of Alberta. I made a success of it even being a green city man, but I would not have tried irrigation farming to commence with. (Laughter.) But these unhappy incompetents were not the only and chief complainers. A number of discontented men are highly competent farmers, many of them with long practical experience in irrigating. In fact, taking the matter broadly, I do not know in Alberta a finer body of farmers than the bulk of the men in the district which I am discussing.

So far as I can see the trouble is this. A very large irrigation and settlement scheme was organized at great expense, in good faith, but with insufficient knowledge. A large number of settlers were brought in by what I must frankly characterize as real estate boosting methods; practical experience soon developed difficulties unforeseen by either side. The first difficulty, perhaps, was the impossibility of getting water on a sufficient scale, and unless I am misinformed, it is agreed that a system of rotation is necessary, not foreseen in the water agreements and inconsistent with their terms. Another new thing was found in the fact that some of the land classed as irrigable turned out to be too uneven in its surface contour for irrigation. This led to a reclassification on the basis that any land that could be levelled at an expense not exceeding $8.00 per acre should be classed as irrigable. Here was an unforeseen addition to the cost of the land. The farmers who had agreed to pay $10.00 to $15.00 per acre extra for irrigable land, and 50 cents per acre per annum, perpetual water rent, on the assurance that they could raise very profitable crops, now found that before they could irrigate, they would have to add another $8.00 per acre to the price of the land. The next new fact was that much of the land was of such a heavy, impervious nature that it became water-logged, spoiled by alkali and unfit for vegetation, and that the only remedy for this is drainage. Professor Shutt during his last visit has reported the truth of this. The report indicates that a portion of the land in question is of this nature. As to how big a portion this is, I prefer to take the testimony of the farmers who have for years lived on the land. So that on this ground, which is admitted on all sides, the cost of underdrainage would also have to be added to the price of the land if irrigation was to be practised. I

have been studying some reports of the United States Federal Department of Agriculture on this subject. The same difficulties are rapidly developing under irrigation in the States. It is estimated that in the old irrigation districts in the States over 10% of the irrigated lands are already rendered unfit for useful vegetation by water logging and alkali, and so serious has the question become that a special sub-department of drainage engineering for irrigated lands has been created. They furnish very detailed statements concerning drainage and its costs. I should imagine it would cost anywhere from $30 to $50 per acre in the district that I am discussing. Here are these two large unforeseen additions to the price of the land under irrigation. Is it fair under such new conditions to insist on the validity of the old contracts, signed in entire ignorance of these facts? I have so far based only on facts admitted all around. When irrigation was attempted it resulted, so far as grain is concerned, mostly in frozen crops. It is contended that this has not been sufficiently tried out. That is fairly open to discussion, but it must be remembered that the farmers bought the farms on the assurance that all these things had been tried out, and that good results were sure. Very few farmers are financially able to carry on experiments year after year. The report on this matter issued a short time ago by the Dominion Government is not very convincing to me as a practical farmer. I agree that the rainfall conditions say nothing against irrigation, often make it desirable. But, in regard to soil conditions and the danger of frost, I think their report is inadequate. I have not time to go into details. But for definite data they base on Lethbridge conditions, which certainly are much more favourable than Gleichen conditions. The report gives very few reliable data for Gleichen, and it is significant that no demonstration farm has been established at Gleichen.

In the Lethbridge convention, Mr. Drake made the following very true statements: "Grants of rights to the use of water under the Dominion Irrigation Act are based upon 'beneficial use.' Water rights are granted only when it is believed that the water can and will be used beneficially." "Irrigation is unquestionably beneficial in districts where the rainfall is insufficient or does not occur in sufficient quantity during the growing season, provided the climatic and soil conditions are suitable for crop production and the water can be applied in sufficient quantity and at suitable times. "A very searching investigation is now under way and substantial justice will be done all round." This was all the farmers wanted. They asked first for an expert commission that could hear and sift evidence from all sides. That was turned down. Then they requested that a representative farmer might accompany the government officers in their investigation. That was turned down. The investigation was made without the knowledge or the co-operation of the complaining farmers. I need hardly say, that such an investigation could not be satisfactory. Professor Shutt in his recent report emphasizes a fact which a recent visit of mine in the Gleichen district has shown me to be much more serious than I had thought, that is the seepage from the irrigation canals. Already in distances varying from 100 yards to nearly half a mile from the canals, I have seen large patches of land changing to alkaline swamps; soapholes are forming, which on the farms have to be fenced and on the prairies are becoming death traps for cattle and horses;

this is rapidly increasing and in another two or three years, if things go on as at present, there will be thousands of acres spoiled. Dr. Shutt urges as immediate remedy drainage. He does not say whether this also is to be laid on the shoulders of the farmers. I don't know whether drainage is the remedy for this seepage. It seems to call for concreting of the canals.

I have tried to present as fairly as I can a very controversial subject. I am not convinced that irrigation will not yet in some form be shown to be beneficial in the Western Irrigation Block, not, I think, for grain farming on any large scale, but for intensive mixed farming, growing green feed, hay, pasture, alfalfa, the whole based on dairying and live stock raising.

I am delivering this address firstly, in the hope of helping to an honourable peace between the water-sellers and the water-users in the trouble district, and also in the hope by doing this of furthering the cause of irrigation generally. I am under the impression that irrigation during the next twenty years may be a much more vital issue in Alberta and in the other provinces than it has been during the last twenty years.

Taking the province as a whole, the last twenty years have been comparatively moist years. Four or five years before that were dry to a degree that I have never seen equalled since.

A great European scientific authority is telling us that we are just emerging from a comparatively moist cycle of years; that we are now entering into a dry cycle, and that, on the average the next fifteen to twenty years will be comparatively dry years. If that be so, irrigation will be needed more than ever before, and I hope this convention will result in giving irrigation under right conditions a great push forward. (Applause.)

CHAIRMAN: I notice that there is provision on this programme for this address to be followed by discussion. We should be glad to hear from any person in this convention with regard to the matters discussed by Mr. Speakman in his address.

MR. TREGO: I notice in Mr. Speakman's discussion of the matter, he has avoided saying anything about the troubles we have been having in the Gleichen and Strathmore districts on account of his not being a practical irrigator. In this I think he has acted quite wisely, but I would like to point out one of the principal causes and say that it is something that no one is able to see by looking over the country, because it is something that is beneath the surface. It was something that Mr. Dennis was not able to see when they were promoting the system and something we were not able to see when we were looking over the lands to buy them for irrigated farming purposes, and that is the sub-soil. The Government reports refer to the success of irrigation in the Lethbridge district, and in that I think they are quite right, but from what I have been able to see of the Lethbridge district and from what I know of the condition of the sub-soil in the Gleichen and Strathmore districts, there is all the difference in the world in the sub-soils. I do not want to be understood to be the opponent of irrigation. I put in over twenty years in an irrigation district before coming here, and I came to the Gleichen district because it was an

irrigation district. I do not want to farm without irrigation. I have lived so long in a country where we could not produce crops without irrigation that I do not want to go back to the hazardous method of farming without irrigation, but I found that though climatic conditions were very similar yet the difference in the sub-soil made all the difference in the results.

Where I lived we had a gravel sub-soil which let all the surplus moisture go away within a short time. Three things are needed to make irrigation successful. That is soil fertility, moisture and air. It is just as bad to have too much moisture as none. In our district the sub-soil is so dense that once the top soil is filled with moisture, this moisture cannot get away until coming to the surface and evaporating, consequently no matter how lightly we put water into the soil, when rains come later on that we cannot foresee, it carries the grain through into the frosts and we get grain as green feed. The sub-soil was something we could not see, neither could the people who were building the system see, but it is there just the same and makes all the trouble.

MR. STOCKTON: I would like to say in reference to Mr. Trego, and in replying to the address given by Mr. Speakman, I have been in charge of the Western Section for five years and I agree with Mr. Speakman that we have good farmers in the Gleichen district and throughout the Western Section, and I think it is true that they are not getting the results from their farming that they would have if they had made more use of irrigation and the water which has been ready for them.

There is one great difficulty which these farmers have had to contend with and that is that they have had a much larger area or unit of land to work with than can be handled well under irrigation, particularly in a new district where considerable work has to be done on the land to fit it for irrigation.

During the time I have been in charge of the work there I have had small areas under cultivation and under irrigation. I have nearly two hundred acres now at places where the company has headquarters which have been farmed and irrigated for five years, more or less, and we are getting splendid results from the use of water at these places and that without regard to the sub-soil conditions.

Of course, the problem of irrigating where there is a heavy clay sub-soil is somewhat different to where there is a gravel sub-soil or sandy sub-soil. We have some sandy sub-soils on lands in the Western Section and some clay sub-soils, but no heavier than exists in other successful irrigation districts. Our main problem in the Western Section is to put on the proper amount of water and put it on at the right time. Danger from frost is a real one unless irrigation is applied at the proper time and in proper amounts. A good many of the experiments made by farmers are on land not properly prepared for irrigation, and some have irrigated in the same way they would have in gravel sub-soils where they could put on an enormous amount of water. It is quite possible to put on water in small quantities and evenly if the land has been properly prepared.

In comparing 1914 and 1915 we had practically twice as much rain this year and we had a more favourable season this year than last year so far as

sunshine is concerned, and later frosts this year, and it is quite possible to put on the land water by irrigation, the difference in the rainfall. If a farmer last year had his land in such condition that he could have put on the difference between the rainfall this year and last, he could have gotten equally good crops last year as he did this year, and it is the application of water in irrigation that will produce the results in the Western Section as well as anywhere else where we have the climatic conditions with an average of less than twenty inches of rainfall, and our average is even less.

The matter of seepage and alkali is one that has to be approached in the same way. Because certain lands have been affected by seepage and alkali, that is no reason for saying that the whole country is going to be in the same condition. The topography of the Western Section is somewhat rolling, and under natural conditions seepage and alkali collects at certain spots. That is greatly accentuated in wet years and in certain places it is impossible to get on parts of the farm. This, of course, would not have been the case had it been a drier year. Some of the land in every irrigation project of any size that has been developed, have become water-logged and seeped up. A good deal of that is due to improper irrigation, poor cultivation of the land, and improper preparation. If we could take time to apply irrigation exactly as it should be, we would have no trouble because we would put on exactly the amount of water required to irrigate the crop. But, it is not always possible to do that, and some pieces of land are apt to go bad, but in a rolling country we are protected by the fact that we have the natural drainage to keep extensive areas from going bad, and I feel optimistic enough to say that I do not think but what we have probably reached in many cases the worst conditions, especially as far as the seepage from the ditches have been concerned, because many of the ditches have been carrying water for ten years and it is probable that all the seepage has developed that is going to develop.

I could talk a good deal longer on that subject and quote a good many statistics to show that by irrigating we have got greatly increased grain crops, and also alfalfa and forage crops and have proven that it is possible to raise garden stuffs and increase production from irrigated farming than possible with dry farming and that it is possible to build a home much more quickly and have the home that everybody would like to see with all the variety of products; with trees and grass in the dry years as in the wet years. Thank you. (Applause.)

MR. BUCKLEY: Mr. Stockton's address puts me in mind of a song I heard many years ago, "The greatest deeds we hear of are deeds we never see done," but Mr. Speakman touched a sore spot when he remarked that there was no demonstration farm at Gleichen. The Canadian Pacific Railway Co. did establish a demonstration farm at Gleichen.

MR. DENNIS: No, sir.

MR. BUCKLEY: But it was shut up and the man was moved to Strathmore where he did not do much better on an irrigated farm. Another thing, when this thing was rife, some of the farmers wanted to jump into a law suit with the

Canadian Pacific Railway Company, and my friend here was the principal one to say, "No, don't, the Canadian Pacific will do what is right, don't get into law with them." We waited in vain. Three years ago, the Canadian Pacific Railway fenced in some land close to Gleichen, which is a little worse in character than the general land. It has more gumbo in it. One of the professional experts said he was glad it was there because he could get better results and show the farmers what to get off irrigated soil.

I came six thousand miles because I heard in Ireland what wonderful things could be done here, and our friends came from the United States, and on the representations of the Canadian Pacific Railway they came. That demonstration farm is to-day just as they left it. There is a small quantity of barley and timothy on it, but it is overrun with weeds to-day. I do not think the barley or timothy was ever cut. I wonder that the Weed Inspector does not make them cut it. What did we offer to the Dominion Government and the Canadian Pacific? We said we will divide our farms with you in as many districts as you want. You irrigate half and we will dry farm half and we will do all the work except putting on the water, which you can do to your own taste, and if you get more than we do we will abide by the results and abide by our contracts. Now, I leave that to the gentlemen here if that was not fair. Another offer, we said to the Canadian Pacific, double the water tax, leaving the use of water optional and they to advance the water as we want it. Was that fair? If the Canadian Pacific had been fair, would they not impress that on every farmer in that dispute which is over two hundred farmers. They are anxious to pay for their land, but want to do it on an equitable basis.

We came here to spend our lives here and bring up our families and educate them and make our homes here, and I would ask any Canadian Pacific officials if I have not made good. Does my home look as if I was going to run away from it? If they can demonstrate to us practically as they offered to do but they have never done it, if they can get results, we want to see it, because we came here to get the best results, and that is why we came here.

MR. TREGO: I came here in 1906, having had experience in Idaho in the United States, and being brought up on an irrigated farm. I came here thoroughly convinced that I wanted an irrigated farm, and I bought one in that district in the year 1908. I commenced irrigating when the first water was turned on that I could use. I irrigated in 1908, 1909, 1910 and 1911, and that has been my last application of water.

The reason I quit is that I put in a patch of timothy hay first and having had experience in irrigation, I wanted to irrigate it. I irrigated one patch three times. As a result of that application of water, one-fourth of the patch was killed as a result of alkali and another patch was little better. I saw that alkali was showing up on my farm wherever it was under water and I knew all that was wanted and I knew all it took was to apply water to the ground and pulverize and dissolve the minerals underneath, and after that would come alkali by reason of evaporation. On the quarter east of us, I irrigated that in 1910, and where I took off forty bushels in 1908 as a result of that showing in

1910 the Government has taken off twenty acres of alkali as a result of irrigation. We want to be judges of what pieces of ground we shall irrigate. We want to pay for what we use and not for something we cannot put it on. I have spots on my farm I can irrigate and yet on other places I cannot irrigate, and yet I have a lifetime tax placed on my farm and forever. I have fought irrigation in that district on account of this. We have made application to the Head Office and have tried to get things adjusted, but we have been turned down on all considerations. We are here at this convention to see if something cannot be done that we may pay for something we are using and not for what we see. I bought the ground thinking it was good. My friend tells me that if we apply the right amount of water we would have good results, and I know it; but I defy him or any other man to tell me how to know when to apply it, because we do not know how much rain is coming in the future. For instance, in 1910, we did not get water early enough to irrigate. I went and started on eighty acres for the next year. Later in the season I summer fallowed the ground above the ditch and summer fallowed below the ditch. In the spring, I sowed below and above the eight cents. The dry farm above the ditch fetched thirty bushels of wheat per that fetched me twenty-eight cents a bushel in Gleichen. It netted me twenty-eight cents? The dry farm above the ditch fetched thirty bushels of wheat per acre. Part of the wheat graded No. 6 and the remainder was cleaned and sold for eighty cents for seed. What we want is that some of our friends get on the ground and have a demonstration farm in Gleichen. I want to know how to avoid the alkali coming up and I want them now to show me. I have closed my gates down and forbid them to turn a drop of water on my farm as the result of the alkali showing. If they will come and show me what can be done by irrigation I will abide by it. I want a home and I have to pay the water tax because it is cheaper than to move out.

MR. FREYBERGER: I am very thankful I did not get in the Gleichen district if it is as bad as they say it is. I too live out here because it is an irrigated district. I came up to this country for the reason that I could buy irrigated land and I have not anything to say about the conditions in the irrigation district of Gleichen at all. I never stopped there. I have never been there. The only thing I fear in discussions of this kind is, that, it will place a discredit on irrigation in districts in Alberta where irrigation has been proven to be a success. I do not mean to say that it cannot be a success or will not be a success in the Gleichen district for I do not know about it, but it comes to a point where nothing but experience counts and previous experience in irrigation does not count here. I had a little instance happen last year which might perhaps explain some of the cases for failures in the Western Section. You know the tendency in running water is to run it only when you have to. It is laborious to run water. It is hard work and if a man thinks he will get a crop without it, he will not turn it on. Of course I have travelled some in the Western Section and I have yet to see a field where the laterals were made properly and at the proper time. If you wait to make your field laterals until after the grain has come up and you realize it is getting dry and you have waited for rain, you will

destroy part of your grain in making your laterals and I imagine that some of that grain is dead or nearly dead and I explain that because of the instance that happened here. We got water late. Why, it is not necessary for me to say. Some waste water got on some wheat and I did not finish watering the wheat, or in other words I did not water it until about the 20th of June. That wheat was six inches higher than the other. In fact the other was almost dead. I noticed in June patches where the gophers had eaten it off and it looked entirely impossible for it to come up. Consequently the wheat not watered never grew up but took on a second growth and never did mature. I cut the wheat I watered properly and watered twice, and that was the finest field I cut this year which is not bad, and was ripe two or three weeks before I cut it, it got so ripe the wind would thresh it out. I apprehend that the trouble is that they wait too long to apply the water and in place of producing a good normal growth they have produced a second growth which is abnormal and there is nothing to it. This year I started in to spoil some wheat. I put in four acres to spoil it. I had heard this discussion and I wanted to see it in my own mind. I heard this about not being able to mature a crop if you watered it in a wet season. I think I seeded about the 20th of April. By that time the moisture had been out of the ground and only about a third of the wheat came up. Along about the 7th or 8th of May I watered it and the big snow came on the 13th of May. That wheat never needed any more irrigation this season because we had ample rainfall, but if it had needed it, I would certainly have watered it. That wheat matured in a less number of days from the time it was planted than the wheat I put in on fall ploughing that I did not irrigate. It ripened more evenly. It made the plumpest wheat I had this year, so I am convinced that water applied at the proper time and in the proper manner will not hinder the ripening of the grain, but will promote the growth of it and consequently hasten the ripening of it. Last year I had an experience with barley. I put it in and watered it and consequently it laid there three weeks and did not germinate. I applied the water on the 20th of May On the 4th of August I harvested that barley. It was a pretty good crop. I don't know exactly what it made. I am satisfied that irrigating that barley did not hold the ripening at all. I am thoroughly convinced that water applied to grains even in wet years, I mean when there is sufficient moisture, is beneficial to it and will not retard the growth but will hasten maturity. (Applause.)

MR. TREGO: I would just like to ask Mr. Stockton one question. He made the statement that if the right amount of water were applied, that is the difference in the moisture between 1914 and 1915, we would have had the same crop in 1914 as we had in 1915. I would like to ask Mr. Stockton what amount of moisture it is possible to apply on a well prepared grain field with the head of water that is furnished by the ordinary contract, one cubic foot per second, for a quarter section? What quantity of water can be applied to a grain field for proper irrigation?

MR. STOCKTON: It is easy enough to answer Mr. Trego. I would do it in this way. If it is desired to put on a small amount of water with a head of one second foot, it would be necessary if you are going to use flood irrigation, to have the land smooth and the ditches close together. You could, however, by furrow irrigation such as in the state of Washington, irrigate any amount of land you choose with a second foot and put on whatever amount of water is deemed advisable.

In 1915 we had somewhere around seventeen or eighteen inches of rainfall on the Western Section and the year before, half of that, and seven or eight inches of water is about what we ordinarily put on with ordinary flood irrigation, and from the experience that we have had throughout our irrigated fields, I am sure that such an irrigation applied early in the season of 1914 would have produced a good crop and it would have ensured the crop in any event. The year before that we had a very heavy rainfall. In June, at Strathmore, we had seven inches of rain—all in about a week or ten days. We had one or two cases where grain was irrigated before that storm and it showed more beneficial results. It was quite evident, however, from observation of these fields that if it had been irrigated sooner we would have got more benefit. Irrigating after the rain would of course have been of no use, but irrigating before the rain would have prevented the crop from being stunted by drought by the length of time the water was put on, and that is the difficulty of irrigation water in an ordinary year that, if there is a drought of two or three weeks in June which occurs in years even where the total rainfall records would show enough to mature crops, proper irrigation at that particular time would put the crop that much forward to allow the normal crop to be harvested before frost when otherwise there would not be a chance by reason of the drought. The rainfall record at Calgary for the last thirty years shows that for twenty-three years there was less than fifteen inches of rain.

In my observations, I think our maximum crops are going to be produced on ground with a rainfall or irrigation around a total of twenty inches, not only from this year's observations, but from experiments with irrigation. When it comes to raising alfalfa and grass we have a much more beneficial effect than with rainfall. In a year like 1914, when many good fields of alfalfa gave no cutting at all, we can have an especially good crop because the sunshine and heat of a dry year is above normal; whereas, the deficiency of moisture is the only element we lack. Going back to Mr. Trego's question, I would consider it desirable to use more than a second foot, and for the farmers to rotate the use of the head and to use flood irrigation in order to more rapidly and economically flood the ground, and it is hardly necessary to state that the rotation method of the delivery of water is in use in almost all irrigation districts in this country and the United States except in the mountainous districts where there is more water than elsewhere.

MR. TREGO: About how much water would be stored in the land by properly applying it with four or five inches, and also at what time of the year would you advise irrigating it.

MR. STOCKTON: The amount of water you would put into the soil by irrigation or with any moisture, would depend upon the soil itself. The character of the soil and the slope of the land and degree of smoothness with which it had been prepared and quite important upon the closeness at which the ditches were put together. That is, taking flood irrigation, ditches one hundred feet apart, and in the method suggested, you could get over three or four inches of water as was done in irrigated plots at Strathmore in 1914. If ditches were three or four hundred feet apart you would allow the water to run until you got it right across. You might put on two or three times that much water and then again it would depend upon the slope of the soil and how nicely it was smoothed. Those things, of course, in their practical application, must be determined by each farmer from his own experience and from the land he is irrigating and the crop he is raising. Some crops will take out a great deal more moisture from the soil than others. Of course, if the sub-soil is not of too impervious a nature it will act as a relief valve which saves us to a large extent from the evils of over-irrigation, but it is a fact that all water which goes beyond the limit of capillarity, say four or five inches, is lost or returns to some drainage canal, and it is not returned to that farm, but it is putting on too much water and leaving the excess to take care of itself which makes for seepage and alkali. The careful use of water and erring on the light side of irrigation rather than the heavy side will make up for over irrigation by conservation of water. That is very important.

MR. TREGO: You did not say at what time irrigation should be applied.

MR. STOCKTON: That is another thing for which you cannot lay down a general rule. Our climate is the most variable that I have had anything to do with. With spring irrigation for grain there is no doubt in my mind that it is ordinarilybest to irrigate pretty early and that depends upon how dry the spring is and other conditions, but in most cases we have been early in putting on the water. There have been too many cases where a farmer has a large area not prepared with ditches beforehand and naturally he hesitates to get out and do some pretty hard work in irrigating the land and thinking the season would be wet enough, he leaves it go to the last minute and then jumps in and does it hastily and does not get the results because he puts on too much water.

There is only one way in which we can get the best results and that is to prepare small acreages, or acreages that can be prepared with great care and properly in every respect, and have irrigation applied just as carefully as any other farm operation is carried on. When we can do that I am sure we will get results by using the same judgment and common sense as to the time of irrigation that we use in the time of planting, harvesting and all other farm operations.

Alfalfa has ordinarily taken to irrigation in all years. This year some has been produced without irrigation and some very well with one irrigation depending upon the drainage and conditions. This is the first year that any field produced any maximum result in grass without irrigation and sometimes it

seems to be best to irrigate in the fall and sometimes in the spring and for alfalfa and other timothy grasses I think early spring irrigation is the best.

MR. TREGO: I would like to have you answer if possible, the question. It is a question we farmers have to know who are going to use the water. You have been here a number of years and should be able to form a pretty good idea as to when we should use irrigation.

MR. STOCKTON: It is not very much good going much further into that. I would say for ordinary and average conditions we should irrigate our grain crops early in June according to conditions, but it is absolutely impossible to lay down a rule which the next season might be an exception to. There is one rule that will always apply and that is that any crop to produce the maximum should have what we might call a certain amount of moisture in the soil from planting to maturity and whenever conditions have reduced soil moisture very much below that amount, it is in order to irrigate unless there is some other commercial or cost condition which influences it. For instance, in this season which has been a wet season so called and in which fine crops have been had without irrigation, I want to say that some of our very good crops as good as any have been upon land irrigated last fall and it is showing that irrigating land for fall crops has not prevented the ripening or maturing of grain crops in such a year as this. So that irrigation did not carry the grain into the frosts, but matured as soon as grain not irrigated. In some cases, this was on summer fallowed land and I agree with you in most cases, the summer fallowed crop will produce good results without irrigation, but in spite of that, irrigation on summer fallowed land did produce good results. For instance, at one of our headquarters, Mr. Robinson had an acre and a quarter of potatoes and he irrigated them carefully and quite copiously in August, and he has matured a very good crop of potatoes, particularly mealy and nice, although raised under irrigation is a so-called wet season, and the crop produced after sorting out frosted and damaged potatoes, was 244 bushels to the acre. And as I say these are particularly good mealy potatoes.

MR. TREGO: How are we going to know in May or June what amount of moisture to apply to the land to produce the proper results. How are we to know what results we are going to get.

MR. DENNIS: Mr. Chairman,—I would not take up the time of the Convention were it not for the fact that this discussion has been introduced by the speech of Mr. Speakman who was invited to speak here as President of the United Farmers of Alberta. However, I think it is quite proper to discuss it at this meeting of the Western Canada Irrigation Association, held in the Canadian Pacific Railway Irrigation Block. I am glad it was introduced in such a reasonable way by Mr. Speakman. I think this discussion should be placed upon a proper basis so that all may thoroughly understand the situation, and although there is a chance that the discussion will take up more time than con-

templated by those who framed the programme, we should thresh this thing out now.

I interjected between Mr. Trego and Mr. Stockton because they can go on asking questions of each other for a week as to how much water to put on and how to take it off and Mr. Trego would not be satisfied with all the suggestions Mr. Stockton could give him, and I am quite sure that Mr. Stockton would not be satisfied with the answers Mr. Trego could give him. Therefore I do not think we should attempt to ascertain or settle what water should be applied and how much at a meeting of this kind.

We are invited to discuss the general features of the Canadian Pacific Irrigation Project and as far as I am concerned I am going to take the opportunity to reply to the criticism made by Mr. Speakman. To do so, it is very necessary to give you a short history of this project and incidentally this will contain the foundation for the unsatisfactory results we have met. I do not claim and never have claimed that our results have been entirely satisfactory.

The first idea that irrigation was required in this district was the result of an agitation started in the city of Calgary in 1894. This was brought forcibly to my mind by the Secretary sending me recently a copy of resolution passed by the Calgary Board of Trade in 1894 stating that in their opinion unless irrigation was introduced into southern Alberta everybody might as well move out and everybody in the city go with them. That resolution you will find in the Minutes of the Calgary Board of Trade. The Calgary Board of Trade, other Boards of Trade and resolutions passed at public meetings in the province of Alberta, which was not then a province as you will remember, said that something had to be done to improve conditions on the land by supplying water through irrigation.

In response to this agitation, certain surveys were made by the Dominion Government, with which I was associated, to prove that water could be taken from the Bow river to this district, from the Belly river to the Lethbridge district, and from other streams to other districts. The Government said we will bear the expense of proving, in a general way, that there is the land and the water and that they can be associated. Having done that we will not go any further. We will not go to the expense of constructing irrigation systems in that country but will bear the expense of showing where the water can be got from and how to put it on the land.

The first scheme taken up was that in the Lethbridge district. The Government made the original general surveys and the Galt Company undertook to build the canals and colonize the district. The next project taken up was the so-called Bow River scheme, the one which was subsequently taken up and constructed by the Canadian Pacific Railway Company and which is the scheme now under discussion. Before going further, it is necessary to outline briefly how that company became interested in this project.

In 1903, a settlement was being made between the Dominion Government and the Canadian Pacific Railway Company and it was found that the Company were owed some three millions of acres by the Government because under the charter of the railway company when they were given their twenty-five

million acre land grant they had a right to refuse as part of the land grant any land not fairly fit for settlement, and when the line was built (during 1881-1885) this country was absolutely dry and the greatest difficulties were met with in getting water for the construction camps. The railway company, therefore, said they did not want land between Moosejaw and the Rockies, as they did not consider it fit for settlement, and so they took a large portion of their land in the northern part of the province and when the time of final settlement came there was a balance of three million acres of land owing to them. The Government had made the surveys of this Bow River block and the surveys showed that it could be irrigated. The railway said we will take this block in settlement of the balance due us and we will consider the matter of bringing water to the block and irrigating and colonizing that land because you say and the Boards of Trade say that unless water is provided to irrigate the land it is no good, and the Government agreed to do that, and finally in settlement of the land grant, the company were given this three million acres and were also given the surveys of the irrigation system made by the Government.

There was no obligation on the part of the Canadian Pacific Railway to build this irrigation system at all. The Government simply said we have proved the water is there and can be put on the block. If you will take the block we will depart from the usual custom and give it to you *en bloc,* because the company could not take up the scheme on the basis of applying water only to every other section. The company then went to considerable expense in making additional surveys which proved that some of the surveys made under Government supervision and direction were very incomplete, but it was proved that the project was feasible and it was finally decided to begin construction at the western end. I am going to tell you quite frankly that we began there against my conviction because I knew that the soil of the Western Section was heavier than that down here in the Bassano district and a thousand feet higher up than the country here in the Eastern Section, where there is probably a week or ten days better advantage in climate. We had to begin at the western end. If we had not, and had attempted to start here and leave Calgary out in the cold, you can readily understand where we would have been at. For these reasons and for the general development of the country, we began in the Western Section. We began the construction of a system in the Western Section that was estimated to cost a considerable amount of money, and it was a difficult matter to persuade our Executive to let us have that much money. However, the money was granted and we went at it only to find that it was to cost a lot more money to complete than was contemplated.

We finally built the system at a cost of three times as much as we thought it would cost in the first place and then we had to undertake to colonize the land. There was no possibility of going to any irrigated country and saying to the people, there is a large irrigated tract of land up here—come up and colonize it. There has only been isolated emigration from any irrigation district and there has never in the history of the world been any marked emigration from any one irrigation district to another, because irrigation produces prosperous condition of farming and home comforts that people do not wish to leave.

We had to go where we could get people to settle this block, irrespective of whether they knew anything about irrigation or not. We went to the United States, to Northern Europe and to Great Britain, and we tried to get every settler we could through the medium of agents who were paid a commission for selling the land.

Mr. Chairman, I want to deal with this whole question on a frank basis. It is a troublesome question at best and one which materially affects the success of this district. There is no use in discussing it in any other way at all. We went out to get the settlers—we went out on the basis of getting them—you know what that means.

I admit frankly that probably certain representations which have not been realized were made by the agents in bringing settlers here. We tried to control these agents when we found them making unreliable statements, but a certain number of people came here expecting conditions which did not exist. I will venture the opinion, however, that 95 per cent of the men on the land in the Western Section, and who are farming there, inspected their land before they bought it. It is true they may have been led to believe that certain results would be obtained by the agents who brought them here and have since been disappointed in getting these results.

This colonization movement was begun in 1907-1908. We had started in 1906. The marked movement of people was in 1907-1908. At that time the only portion of the irrigated district completed was that tributary to Secondary Canal "A," between Strathmore and Gleichen and the first colonization carried on in the block was at Gleichen. Why? Because it was the best district in the block. It was a fine piece of country, the slopes were easy and it was practically the first district that was colonized and it was soon sold out. We then went along quietly building the irrigation system in the balance of the Western Section and trying to colonize the land.

In 1910, we had a dry year, one of those recurring dry years which we, who have been here a long time, know with absolute certainty will come again. The settlers in the Gleichen district who had come in 1906 to 1908 had made no attempt to irrigate their farms. They had not levelled the land or put in the ditches that are needed to make irrigated farms and were caught without the work having been done to enable them to distribute the water. The water had been brought to the highest point in the district. From that point we had to drop the water into a coulee, although it was bad engineering, necessitated by want of money. Then it was taken from the bottom end of the coulee and distributed to the district. Carrying the water through the coulee took a lot of silt from the coulee with it and carried it into the ditches below and when the demand came we were not able to supply the necessary amount of water. We have made that statement over our own signature.

There were some farmers in the district who did not get the amount of water they should have got, and as a consequence there was trouble and complaint and we endeavoured to settle it by writing-off the water rent or making settlements with those who had not obtained their full share of water.

Following that year, we had some wet seasons when irrigation was not so necessary, or thought not to be needed, but we went on and got the larger part of the Western Section colonized until we had sold, in the Western Section, some two hundred thousand acres of irrigated land and a considerable portion of the non-irrigated land, and we had reached the point where we had constructed the system and colonized the land and where we hoped that we would have peace and quietness and success. Instead, we found it was the opposite way.

We found a large number of farmers in the Western Section were dissatisfied. Here are the main grounds of their complaint.

They claimed that while we sold them irrigated land, it was too rough to be irrigated economically; they claimed that applying water to the land brought up alkali, and water logged the land, and where water was applied to grain crops, it retarded the growth and therefore it was later in maturing than crops grown on non-irrigated land and, consequently, it was caught by the frosts. They claimed that the water supply we had contracted to give them under their contract, as approved by the Government, was insufficient. Under the law every contract entered into between the company and a purchaser has to be approved by the Government, and these contracts provided that we were to supply one cubic foot of water, flowing continuously during the irrigation season, for each quarter section. They claimed it was not sufficient—perhaps that is not the right word to use—they claimed they should get a greater head of water. We endeavoured to adjust these complaints, first by undertaking to re-classify the land and to carry out the re-classification as determined by Mr. Stockton and his engineers, and to amend the contracts accordingly. Some accepted, but others said, "No, we won't abide by your re-classification."

Then meetings were held and complaints were filed and abuse was indulged in. I do not hesitate to use that term because some resolutions passed by the farmers in the district, stated I did not know anything about irrigation and never would, and that they had been "flimflammed" to use our western language.

I have tried to give you in a brief way how we reached this point of difference of opinion between a certain number of farmers who purchased irrigable land as to the character of the land, quantity of water, suitability of country for the crops and for irrigation. As we could not agree between ourselves, the farmers then filed a petition with the Government.

In Canada we differ materially in the provisions of the law from districts in the United States where water is used. Here the law relating to the use of water for irrigation, as contained in the Irrigation Act, is a first class law. It has been so certified to by expert irrigationists in other parts of the world and it has frequently been referred to as such by the International Irrigation Congress. Under our law the full administration of the water is in the hands of the Minister of the Interior. The petitions were prepared as above stated; meetings were held and finally the farmers appointed representatives to meet the Minister in Ottawa and we met them there. After hearing the settlers' side of the case, we made this proposal to the Government,—We will be will-

ing that you appoint a corps of engineers to re-classify the land and that in re-classifying it they shall apply to the re-classification a basis which is a fairer basis than we used to classify the land in the Western Section, because at that time we had not the money available to make complete contour surveys and since then we have found that we made some mistakes. We suggested that the Government engineers should adopt the basis that we used in the Eastern Section, it being a better basis than we used in classifying lands in the Western Section. However, we said, we will abide by your re-classification. We will say to every farmer, you appealed to the Government—that is the final Court of Appeal under the Irrigation Act—and while we are advised legally that having entered into a contract with us and having signed and accepted that contract, there is no basis on which any purchaser can force us to accept the re-classification we are willing when you notify us of the re-classification to change the farmers' contracts. You can consider the question of soil, alkali and everything you like. We ask you to say, however, to the farmers that if we are to be bound by your decision they should be bound by it also. That is the basis of all settlements. If we go to arbitration or the courts, it is the same.

In this case the farmers said, "No, we won't do it. We want you to re-classify the land and the Canadian Pacific Railway to be bound by the re-classification but we won't agree to accept it." We said to the Government, alright go ahead but send each purchaser of irrigable land a letter saying that you think they should accept the Government re-classification and send us the agreements and we will sign them. We then asked the Government to send the agreements to the purchasers, pointing out that under their petition and under the powers vested in the department, they were going to re-classify the land and that the Canadian Pacific Railway had agreed to be bound by it and asking the farmer if he would sign it.

The Canadian Pacific Railway signed every one of these agreements, before they went out in the mail to the farmers. Some of the farmers did sign, but others said, no they would not. The Government has gone on re-classifying the land. We had no representative on the re-classification parties. We were bound by their re-classification. Then why should the farmers have a representative? They appealed to the Minister, and the Minister had appointed the engineering body to classify this land. They sent to the United States and obtained the very best qualified men. They went ahead and completed the re-classification.

When the agitation started for this re-classification there were about six teen hundred contracts for purchase of irrigated land outstanding; sixteen hundred men who had agreed to buy land with more or less irrigable land on it. I am speaking in general figures. If Mr. Speakman desires it I will give instructions for him to have the definite figures. Of that number probably half, or eight hundred, of the contracts are held by men who bought the land speculatively and who have never been on the land and are not there now. That leaves eight hundred in occupation, and say eight hundred not in occupation, and up to date of the eight hundred in occupation, 590 have accepted the re-

classification and have changed their contracts and water agreements and said they are going to adopt irrigation and make it a success. That leaves say 210 who have not accepted this re-classification. Of those 210 there are a certain number who have not agreed owing to complications in regard to outside matters, and therefore I take issue with Mr. Speakman's statement that the majority of farmers in the block are dissatisfied, because, as I have shown, of the eight hundred resident farmers who own contracts, 590 have accepted the amended contract and water agreement. That leaves 210 who have not.

That is the whole story, Ladies and Gentlemen. We regret more than I can say the trouble that has arisen. We regret that we have had to resort to the courts in regard to any man who occupies our land in the Western Section. We have only applied to the courts because, after they appealed to the Minister and his officials under the Act, they have refused to accept their rulings. We fortunately live in the British Empire and have that respect for the law which has made the Empire what it is. It is respect for the law and through an enforcement of the law that we are going to decide this question finally and absolutely. (Applause.)

We are doing and have done and are willing to continue to do everything that a corporation can do. I, personally, have undergone all kinds of abuse and criticism for four or five years. If I am one half of what I have been called, it is surprising that I should be at large. Some of the dissatisfied settlers in the Western Section have sent a message to the people of the United States saying, "Don't come to Canada, because it is no place to come to. If you come to the Irrigation Block owned by the Canadian Pacific Railway you can never expect to succeed because we have tried it and have been flimflammed in every way." That is the message that has been sent out from the Western Section of the Irrigation Block by a percentage of the men who have not signed their amended contracts. I do not propose to argue that any man should be limited in exercising his right to criticize me or the company or the land on which he lives, but having had every opportunity to settle this dispute through us, then by the decision of the minister to whom they appealed, and finally through the courts whose decision will bind him as it binds us, I can only say that it is poor policy on any man's part to foul his own nest by trying to dissuade people from coming here to throw in their lot with us as citizens. If he is right why have two-thirds of the men with equal grievances in his district said that they are satisfied.

The production of crops by irrigation in the Western Section of the Irrigation Block is possibly a contentious matter, but I will state now that there can be produced to-day from the Gleichen district just as many men farming irrigable land who will say that they are satisfied and have had absolutely good results from irrigation every year as men who will say the opposite. I know the men who have done the most in irrigation in the Gleichen district, and their statement is that irrigation is a complete success.

I apologize, Mr. Chairman, for taking so much time in discussing this question, but I do not think there is anything of greater importance to be discussed at the Convention. This is the Western Canada Irrigation Convention, held to

give those interested in these questions an opportunity to present their ideas, and therefore any recommendations of this Association on this subject, or the subject generally of irrigation, will carry more weight than the opinions of the Canadian Pacific Railway Company or any person having a personal interest in this important matter.

This is the first opportunity I have had at a meeting of this kind to discuss this question fully. It was introduced by Mr. Trego at the International Irrigation Congress last fall, but that was not the proper time or place to wash our dirty linen. It was not proper that it should be stated—that there was trouble in certain Canadian districts and put on the record of that International Congress, but it is proper here. We are all residents of Western Canada where irrigation is practised. We are all interested in the proper carrying out of this Canadian Pacific Railway project, and we are interested in making it clear, if we are able to do so, that the advantages of irrigation in certain districts in southern Alberta are established. If we have the information to show, let's do it.

If the Convention has anything before it which justifies it in passing resolutions to say that it was a mistake to construct the irrigation system in the Western Section of the Irrigation Block and that the majority of people resident there do not want it and no other people should be allowed to come in and engage in irrigation, let us have these resolutions now. If any man in the Western Section in occupation of land thinks, or has thought during these years, that he made a mistake in taking irrigable land, why did he not come forward and say, I made a mistake in buying irrigable land, give me non-irrigable land. We stand ready to-day to change irrigated land for non-irrigated land in that district. But, after spending four and a half millions of dollars in that section to construct the irrigation system, why should we be asked by a man who paid $25.00 an acre for irrigable land to be relieved for all time from the water rental on the ground that his land should be non-irrigable land; that is an absolute absurdity because we have for all time to carry water through his farm to supply water on the next farm to the man who wants and believes in irrigation.

I again apologize for taking up so much time, but I think it is only right, considering that it is the Canadian Pacific Railway Company's project, the Canadian Pacific's investment, and the Canadian Pacific's efforts in colonizing this land that is under criticism, that the matter should be fully discussed and thoroughly understood.

We have done all we possibly could. We have made mistakes and we will make more mistakes. It is only the man that does not do anything who does not make mistakes. We want to give every man a square deal, though Mr. Trego and some others may think otherwise. They can think that I am a horse thief if they wish, but it is for them to prove it when the proper time comes, and so far as this case is concerned the courts are now going to settle who is right and who is wrong, and no amount of discussion here is going to alter it. (Applause, long.)

MR. TREGO: Mr. Dennis in his talk has gone over the ground very fully, but the main thing he seems to find fault with us farmers is, that we do not accept

the re-classification from the Government. I would like to ask Mr. Dennis who was it that furnished the basis on which the re-classification was to be made.

MR. DENNIS: The Government said when they undertook to do this re-classification that they were going to do it in accordance with certain rules which Mr. Trego had seen. The Government said, before we go at it we want all the maps and surveys on which you based your classifications and we will see those and go out with our own engineers and classify that land as we see fit.

MR. TREGO: What I meant was the basis that the Government decided on that they would classify everything that can be irrigated with an expenditure of eight dollars an acre, either in levelling your farms or in order to get the water over the surface of the land. Was that not supplied by yourself at the time of the meeting in Ottawa?

MR. DENNIS: No. At the time of the meeting at Ottawa I said that when we classified this land we did not have as much money as we would have liked to expend on it. Therefore, I laid down the basis that all land which lay under the point at which the water could be brought to the land was irrigable. We brought the delivery ditch to the quarter section boundary and all land on a lower level than that was classified as irrigable. When we came to do that in the Eastern Section we found that it was not altogether fair. Certain land might be sold and would cost too much to irrigate, therefore after consideration we adopted the basis that any land that would cost more than eight dollars an acre to level and get in perfect condition to irrigate or to be reached by a flume, should not be included. When we agreed to the re-classification in the Western Section we said we do not ask you to re-classify on the basis originally used in the Western Section but on the basis we used in the Eastern Section, and that was the basis adopted.

MR. TREGO: When our representative returned from Ottawa he gave us this as the basis on which the classification would be carried out, and we said we would not agree to it. Then Mr. Dennis stated the number of farmers who accepted the classification and signed up contracts, and are perfectly satisfied. The first number I think is right, but the last number, where they said they were satisfied and are going ahead to make a success of irrigation is not, for I know a good many farmers who have signed contracts simply to avoid the expense of a lawsuit. Mr. Dennis made the statement that he was satisfied that a great many more farmers could be found in the Gleichen district that were satisfied than those that were not. I am ready to put up a cheque for five hundred dollars cash to get his number of farmers together. We will let the farmers of the district say which side they will join, or if Mr. Dennis wants to get the users of water in the Gleichen district, he can get 99 per cent. of the farmers of that district who will give up their irrigated contracts and take non-irrigable land. I know there are a good many farmers who have signed contracts, but I do not think it is because they are satisfied. I think if it goes to a vote of the people it would go 100 against you.

MR. BUCKLEY: On behalf of myself and farmers in the Gleichen district. I would like to make perfectly plain to the meeting that they do not disapprove of irrigation in its proper place, neither did they send out word that we have been flimflammed, don't come here. We told settlers not to sink too much of their money in their land until they proved it a success, but when they proved it to go ahead. We do not find it a success in our district and I think the press has placed us in the same light Mr. Dennis says we make him. That is the stand we take. We are not running down irrigation in the Lethbridge district. We have heard it is a success. We have heard it is a success in other places, but it is not a success in every district because neither the C.P.R. nor the Government will dare to test it out before our eyes where we can keep tab on everything that goes on. In fact, I was writing a little time ago to a friend and he blamed the late Government for inaugurating this scheme and the present Government was easy, and I said the late Government made a mistake and the C.P.R. did also make a mistake and they are now too proud to admit it or test it out.

Another thing we did not say, and that is, that applying water to a grain crop in our district retarded the growth. I never heard that, but I will tell you what we have heard. It promotes the growth so luxuriantly that it carries the crop into the frost. Last September twelve months, a neighbour of mine concerned in a threshing outfit along with me, was induced to irrigate his grain crop in the month of June—his wheat crop. I had mine on summer fallow. I telephoned up to him in September when I was threshing to know when he wanted the outfit and he said just about Christmas, and I said, "Why, have you not done cutting?" and he said, "No! I have just started. My wheat was in Fort William when he had just started cutting, and this is one of the men that the C.P.R. quote as being a successful irrigator. Another one they quote is in their employ, and he put his photograph in the papers and told us about the wonderful crop he had. His wheat went to the elevator and he had 35 per cent. of weeds in it when it was cleaned. I believe he has gone since to manage a farm for a big English syndicate. I hope he will succeed. One thing has troubled us in the Gleichen district and that is we have heard many reports of successful irrigators but we could never find out their location so that we can go to see them. One man who was posing last year, and his name was in print, sold two carloads of seed wheat to a seed merchant and the seed merchant thought it was so good he got it all. When he came to deliver it he could not make it up although the threshers say they put it in the bins. We want to see the thing demonstrated. We do not want law. That is the very thing we are up against. You cannot stand up against them. They are a big corporation. They are the Government. Mr. Dennis spoke in a very determined manner and we are prepared to do the same and are willing to take our bundle on our shoulder until we do get fair play, although every cent of mine is sunk in that and some of what is borrowed.

Now, gentlemen, I would not for the life of me say anything that would reflect on anybody, neither would I say anything offensive to anybody and I hope anything I say will not be taken personally. I might say that what we

would have preferred above all others is for the Government to take a small plot, an average plot, and test it and farm it and we would do all the work except put the water on. We want a perfectly fair deal and that is all we want.

We are living in the best country the sun shines on but if we could get it demonstrated before us and have it demonstrated before our eyes, why, we are ready to put our shoulders to the wheels as Mr. Dennis has said and he will admit that some of us have put our shoulders to the wheels and made a success of farming without irrigation, but we want to get the best out of it.

MR. FREYBERGER: I have only a few words to say. Last spring a man came by my place. He was homesteading across the river. He owns a farm up at Gleichen. I can get his name if it is necessary, and he asked me what I thought about irrigation and I told him, and he told me where he lived and farmed and he stated that last year, the dry year, he lost a thousand dollars in oats by not irrigating. I said, "How did you reach that conclusion?" He said, "I was irrigating some trees and the waste water ran down to these oats, and taking the difference between these oats and the other oats in the same field and estimating the price of the balance of the field where the oats were, was a thousand dollars." I said, "You bought it, why don't you use it?" He said, "We are not using water in our district," but he said, "I am not going to do it that way any more." That is so much for that.

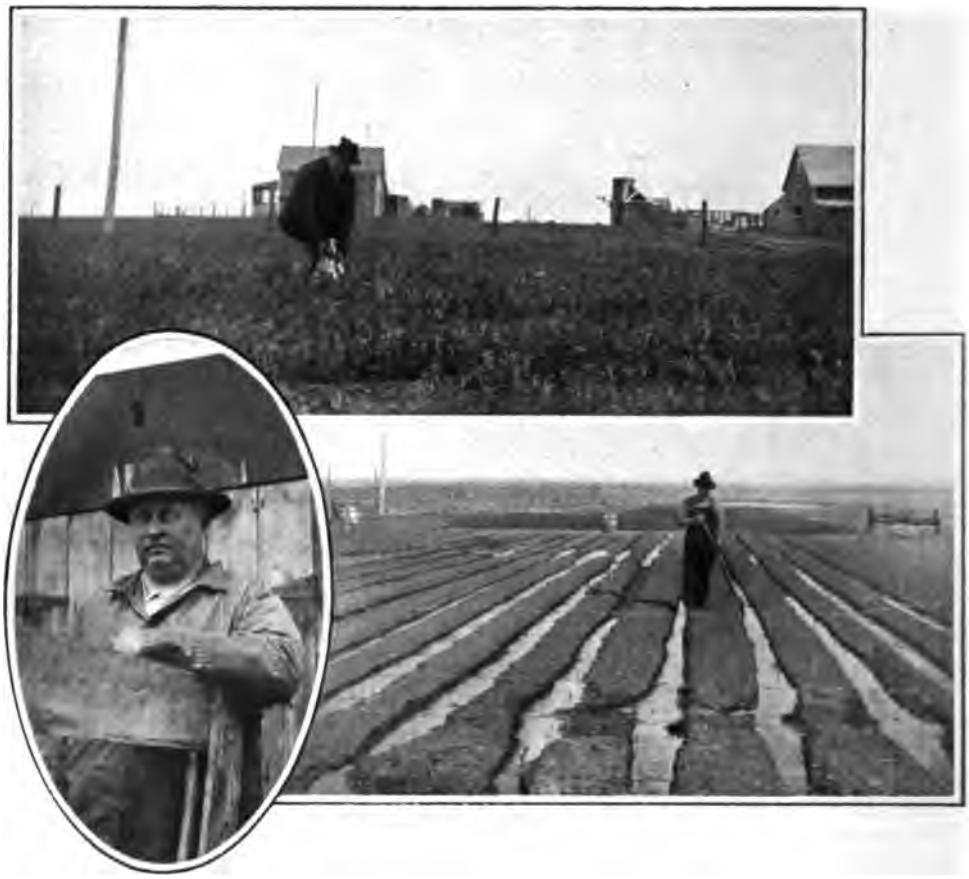
Now one word about sending word to the States. I believe I can produce files of the Denver Post with articles written by a gentleman who spoke who signed his name as being Secretary of the United Farmers of Alberta, in which he made the most derogatory statements about irrigation that could be made, and advised the people not to come, and further than that he said "The district I moved from laid right alongside this district," and he had moved; consequently if his was a failure, ours would be too. I believe I can produce the files.

MR. DENNIS: I can produce forty of such articles.

MR. FREYBERGER: I believe they have done their best to keep the experienced irrigator out of this country and they are doing an injury to irrigation. If the Gleichen district is poor I don't know about that—I am not saying it is, but I do object to them casting reflections on every district in the province of Alberta where people are successfully applying irrigation and are satisfied. (Applause.)

CHAIRMAN: I think we have gone on as far as it is necessary as no person has moved a resolution. I suppose no person expected to move a resolution as this is a meeting for three provinces and this is a problem peculiar to Alberta alone. The next speaker on the programme is Mr. I. D. O'Donnell, but he is absent and I have a letter from his secretary in which he states that business in Denver has prevented him from coming here.

MR. PEARCE: I would like to announce first, that Mr. Lawrence has been appointed Secretary of the Committee on Resolutions and if you have any



Alfalfa and Irrigation on Pattin's Farm, Bassano, Alta.

resolutions with respect to any matter to be brought up before this Convention, I would ask that you kindly hand your resolution to Mr. Lawrence, when it will be dealt with by the Committee.

The next speaker will, therefore, be Mr. Howes, the Dean of the University of Alberta, Faculty of Agriculture.

AGRICULTURAL EDUCATION IN ALBERTA

MR. HOWES: In beginning an address of this kind one is expected to say something conventional, and I shall be no exception to the rule. I am glad to have this opportunity of appearing before you and of becoming acquainted with those gathered here. Although this is conventional in form and sound, I would like you to know that the feeling behind it is deep. I look upon it as a real privilege, that I am given the opportunity to present to so progressive a body of men my ideas upon a subject so important to Alberta, upon which I have spent some years of study and work, and to which I hope to devote the remaining years allotted to me. As Dean of the Faculty of Agriculture at the University of Alberta, it becomes my duty to keep the subject of Agricultural

Education before the people and to use every opportunity to further the cause. Therefore, I welcome this as my first chance to speak in an official capacity for that great profession of agriculture. I have only one regret, and you will share this with me before I am through, and that is, because I am unable to present so important a subject in the best manner possible. Our philosophic friend Dooley classifies public speakers as follows: "The man who has something to say, but not all the words he could wish to say it with, may get along fairly well; the man with something to say and the right words to say it with makes a great speech; the man who has nothing to say and a torrent of words to say it with—that man's an orator." According to Dooley's classification then I can only hope to rank among those who "may do fairly well."

A young province or state shaping her scheme of education is in an interesting and advantageous position. If she will maintain lofty and practical ideals and if she be willing to profit by the successes and mistakes of older states she may build broad and firm a foundation for the education of her children that time shall not put to shame. Then, too, she may, by a study of the successes and mistakes of older states, accomplish in a few short years, or even months, what it has taken the older states many long years to accomplish. Alberta stands in that interesting and advantageous position to-day, and it is my purpose in connection with comment on education in general and particularly agricultural education, to outline for your consideration what Alberta has accomplished to date in the scheme to educate for the profession of agriculture. This outline is intended to be descriptive rather than eulogistic, to lay before you what has been done and to give reasons for it, rather than to boost the work of any man, institution or party. There may be better schemes and no doubt time will modify plans now in operation, but such as they are I shall lay them before you, asking your friendly criticism and assistance.

For the purpose of systematic discussion I have divided my subject as follows:

Agricultural Education in the Public School.

Agricultural Education in the High School.

Agricultural Education in the Schools of Agriculture.

Agricultural Education in the University of Alberta.

Agricultural Education for the Adult.

What has Alberta done? Profiting by the experience of older provinces, Alberta early sought to make agriculture an integral and important part of the school course. An experienced committee drew up a course of study in agriculture that is second to none I have ever seen. But a course was not enough. A text book was prepared, based on the course drawn up, and written to suit western conditions. I refer to the book written by Mr. J. McCaig, just published, a book that most of you who have read it will agree with me is in a class by itself as regards diction, arrangement and illustration. But a course and its text book is not enough; the teachers must have special training and that training we have been trying to give them in the summer session for teachers at the university each year. Two years ago the attendance of teachers was 80,

last year 155, this year over 300. In addition to courses for teachers there has been given a course to inspectors. I may say that I was requested this summer by four clergymen to use my influence to have put on a course for clergymen—this speaks well for Alberta, for her agriculture and for her clergymen.

Perhaps you ask, "why should agriculture be taught in the Public schools?" If so, I feel like exercising an Irishman's privilege by asking "Why not?" However, I shall advance two reasons and if you can dispose of these you have taken away most of the spirit of justification for the faith that is in me.

First, agriculture should have a place in the Public school because that is the logical place to begin education of any kind. It is not the sum total of agricultural facts that the child can learn there that count; it is the bent of mind induced. Train him to think of things agricultural at that age and when he is older he will not depart from them; when he is older he will not, as perhaps his father does now, hang the agricultural bulletin—the production of much labour and research—beside the kitchen window to be used for shaving paper. No agricultural educational system can be a success unless it begins with the child. With the exception of a few of us, boys who are perennially young, who happily have kept alive some boyhood ideals, most adults are past redemption. The hope of the country is in its young people and healthy progress rests with them. Let us see that our children are able to do a little better than we have done.

My second reason is that it is largely education in things agricultural that can check the abnormal drift to the cities. Thank goodness the day is past when it is thought proper to keep the dough-head on the farm and send the smart brother to school. Of all professions, agriculture makes the greatest calls upon all the fundamental sciences and it takes brains to make a farmer. Therefore, this abnormal drift of bright boys and girls to the cities is to be deplored. I would like to submit to you the idea that this regrettable exodus is caused by the feeling—too long prevalent under our old educational systems—that to rise in the world the boy must leave the farm. Why should he think otherwise? If he respected his teacher he must feel that farming and education were things entirely apart. On the other hand, if he sees the profession of his father recognized as a major on his educational course, he is bound to feel for it a proportionate respect. Agricultural education will not bring back the boys and the girls who have gone, for the bright lights get them; they will never come back until a diet of husks drives them back to see how chances are for the fatted calf. But we can keep a proper number of the children on the land if we educate them properly and the Public school teacher should begin the work. Of course, reasonable work hours, and proper diversion and recreation are not to be neglected if we study to hold the children on the land.

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If agriculture in the Public school is important, we would be justified in one sense in saying that agriculture in the High school is doubly important. It is perhaps more than ever necessary that the child should see the profession of his parents recognized as worthy of an important position in his course of study;

that he should feel that agriculture, that science or combination of sciences pertaining to the home life he has just left, has come into its own dignity of position, and that he is not necessarily improving himself by forsaking the farm. This, however, is just mentioned in passing, because after all it is but a reiteration of the argument advanced in favour of placing agriculture in the Public school. There is another, a very weighty reason for the recognition of agriculture in the High school. We look to the High school to furnish us all our teachers for the Public schools. Practically all our High schools are found amid town conditions; indeed many of them are town-bred as well. Then, after a short time at a Normal school, also amid town conditions, they begin their teaching in a rural district; they are turned loose upon an unoffending rural community; it is not fair to the community and certainly it is not fair to the teachers. It is therefore not only advisable but absolutely necessary, that these young would-be teachers receive an adequate measure of agricultural teaching, that shall send them out to their work armed with the sympathy that comes with understanding. That so many of the young teachers, mostly girls, have succeeded, speaks strongly for the personality of the teacher body of Alberta.

Alberta is meeting the call for agricultural instruction in the High schools. A course of study is drawn up and in the absence of a text book, a syllabus or amplification of that course of study has been printed. A course for agriculture for High school teachers was put on at the university and this was one of the most satisfactory courses yet given. About forty High school teachers in the High schools in Alberta took advantage of it, and I wish here to speak a word in acknowledgment of the high calibre of the teachers in the High schools in Alberta. In addition to lectures and indoor laboratory periods, an attempt is being made to introduce an outdoor laboratory course. I would advocate a series of experimental and demonstration plots; plots where many kinds and varieties of economic crops could be grown; plots where annual crops could be grown; plots where simple soil and plant experiments may be carried on. I guarantee that the High school boys and girls will get from this course alone that which will send them out to the work of teaching feeling more fit, send them out armed with the sympathy that comes with understanding.

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So much for agriculture as part of the regular school curriculum. I should now like to speak of special forms of agricultural instructions.

You have all heard of the three schools of agriculture established at Vermilion, Olds and Claresholm. I wonder how many of you have visited one of these schools and seen the very practical nature of the work put on there. Be it known at the outset, that these schools are first of all and most of the time for boys and girls who expect to return to the farm to become the country home-makers of the future. When the two-year course was drawn up, it was aimed to give as closely as possible the work given during the first two years at Guelph, Manitoba or Wisconsin. Inasmuch as the terms were only five months

in length, the slack period of our western year, and as there would be fewer instructors in such a school, part of the regular college work was weeded out. A very practical course in Field Husbandry, Animal Husbandry and Farm Mechanics for the boys and Household Science for the girls was drawn up. A certain amount of science work was given and as much time as possible devoted to English and mathematics. These schools have been in operation two years and appear to be just what the people want. The total attendance during the first year was 268, and last year, despite adverse conditions, the attendance was 327. This year it would appear that the schools are filled to capacity; indeed one of them has been obliged to transfer applications. This I take it is a proof as to whether these schools are successful.

You will be interested to know the kind of student attending these schools. Well, they range in age from 15 to 30 and in educational standing from Grade I. to Grade XI. At present a large number have not been at school for some time. They left older districts before they had time to get much schooling, and since they came to Alberta they have not had much time to go to school. Now they are too big to enter the grades to which they must be assigned in the regular school work, and they have welcomed these schools of agriculture as a fine chance to get education otherwise denied them. At the end of the two years all who have satisfactorily completed the course receive a diploma, and those who take a standing sufficiently high are given a pass that entitles them to enter the Faculty of Agriculture at the University of Alberta. It is fair to suppose that the next few years will show a marked progress in attendance at these schools of agriculture. Already there is justification for building more of such schools. I believe the attendance in Household Science will increase as times get better. I believe we shall have a better educated lot of girls and boys entering these schools, because the comparatively uneducated class, just mentioned, represent a class caused by pioneer conditions, and one that is passing, and because the schoolhouse has found its way into every settled part of our province.

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At the University of Alberta the Faculty of Agriculture has been established this year. A three-year course continuous with the two-year course in the schools is contemplated, making in all five years to secure a degree in agriculture, the B.S.A. degree. During the first year of the university course it is aimed to give a good grounding in Science, English and Mathematics, accompanied by enough Field Husbandry and Animal Husbandry to keep the boys up and fresh in this work. Then in the last two years full attention will be given to specialized practical work. Details of the course for this year have been worked out; details of the work for the succeeding years will be worked out later. As the Faculty is newly established it is perhaps premature to tell all we are going to do. I prefer to do something before I talk about it. However, there are some things I feel it my duty to tell here. We believe that the schools of agriculture scattered about the province will serve many more students than would a central institution alone. None the less a central institution is neces-

sary to standardize the work and to give further education to those who are able to get it. The work at the schools followed by the work at the university should turn out a good practical student. In attendance at the Faculty of Agriculture we can never hope to compete with agricultural colleges of other provinces in numbers of students; but in numbers attending both schools and university we will soon be beyond any of them if we are not past them already. At the university, however, we are going to strive to excel in quality rather than in quantity, so that in the future it will be a distinct asset to any boy to say he obtained his degree in agriculture in Alberta. We want to get a staff of first-class instructors, the best is none too good. It might not be out of place here to mention some points which we hope to emphasize.

The course at the university is to be just as practical as we can make it and based on the fundamental sciences.

In a live stock province, where the slogan is "mixed farming," Animal Husbandry must be our leading course. Our boys must get a thorough grounding in feeds and feeding of live stock, in breeds and breeding of live stock, and also, they must have a good practical grasp of Veterinary Science so that our graduates can get out and do things, not talk about them.

I have in mind next that our graduates shall know how to teach. Heretofore agricultural graduates have been turned out to teach agriculture without sufficient training in the science of teaching, and these will bear me out when I say that the graduate in agriculture should know how to teach just as much as the graduate in any other line. Think of the absurdity of sending out graduates in agriculture, without any knowledge of the principles of teaching, to work along with men who have had that training. Our boys must have the training that shall fit them to teach anywhere. If they do not teach, the training is good for them, if only when their own kiddies start to school, and it should fit them to make good school trustees.

Our graduates in agriculture should have a good standing in English, i.e., in reading, in composition, in agricultural journalism and above all in public speaking. In this connection reference is not made to training in oratory and in elocution, nor to the general conception of a public speaker. Our boys, who must go out as pathfinders in their work, whether on the farm or in the office, are distinctly handicapped in that they must early face audiences of people so much older and wiser than themselves and so much depends upon the impression they make. They should then have training in standing up and in simple straightforward manner and language saying what they have to say, and then knowing when to sit down. I never had that training.

We must emphasize, more strongly than ever, co-operative production and better markets. This calls for a course in scientific farm management and in rural economics. We have talked better production for a long time; along with this let us now see if we cannot develop in the direction of better disposal of the products.

One last thought in connection with the Faculty of Agriculture. Too long, and often with ample justification, it has been said that agricultural education weans the boys away from the farm. No doubt many of the boys who

come to us will go out to take official positions or to enter upon the work of teaching. Also, we hope that many will leave us to put into direct practice what they have learned. Our ideal is to send as many boys back to the farm as there are boys who have farms to go to. A great deal depends on the spirit in which the education of the boy is handled. I wish to record here an axiom—a proverb—that education never hurt the right kind of a man. You may tell me of college graduates who have made poor farmers; well, I will tell you of college graduates who have made splendid farmers. The poor ones would never have been successful anyway, and probably they did better with their training than they would without it. Mark this, the day is at hand when greenness and farming will have no more connection in the popular mind than verdancy and real estate business. Sophistication is apt to follow the automobile, and most of the autos are going on the farm. Less and less is the farmer becoming a party to that system of segregation that has so long been responsible for lack of recognition of the dignity of the agricultural profession.

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When I come to the question of education for adults I am approaching debatable ground. Frankly, I am of the opinion that the adult who can be educated far in agriculture is just about as scarce as the adult who can be educated far in law. A few of us may have been fortunate in being able to maintain some ideals from boyhood days, when a moon shone on every telegraph pole, but for the most part we, who have topped the hill and are jogging down the sunset trail, have our habits of thought and action pretty well fixed. We enjoy Farmers' Institutes, Short Course Schools, Demonstration Trains, Seed Fairs and such, because they brighten us up a bit and give us something to talk about; but we would hesitate to admit that the best service performed by these institutions is in the number of lads they interest and entice away in search of further agricultural instruction. Yes, it is hard to modify the practice of adults, but there is one way to reach many of them, and that is through their children. Many a farmer has gone against his own judgment to give his boy an opportunity to work out an idea perhaps learned at college. My own idea is that we can do most for the adults through their children. In no other field is it so true, that "a little child shall lead them."

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Sir, I have tried to lay before you to-day what appears to be a logical scheme for agricultural education. Begin with the child as in the case of all true education. Carry it through Public school to High school, then to special schools of agriculture, and lastly, if time and money permit, to the university. I wish to close by saying that we appeal for your hearty interest and support. Aid us in trying to make the next generation just a little better than ours.

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CHAIRMAN: Discussion is asked for on the matter dwelt on by Mr. Howes.

VISITOR: I would like to ask the question as to the situation between the Public and the High school and the Agricultural school. What connection the High school has between the Public school and the Agricultural school.

MR. HOWES: My idea was the connection all the way through; it was this. We are giving the boys more and more and carrying it on simply by rolling up the importance of the work in the nature of the snowball. That is the same spirit that is encouraged throughout the whole school. The boy does not have to go through a High school at all.

VISITOR: What education does the boy get from the Public school that will fit him to carry on a farmer's life? In the High school what benefit does he get? I have had some experience by sending a boy to a High school. What benefit would come to a man who carries on the agricultural pursuits after going to the High school?

MR. HOWES: If the individual is able to profit by that amount of education —if he should take an interest in it?

VISITOR: What is there in the High school education that will benefit him in carrying on an agricultural pursuit? I am speaking between the two schools.

MR. HOWES: As far as my memory serves me there was a syllabus drawn up giving the course of study in the High school and the teachers seemed to think it comprehensive enough. It took up soils, air in soils, and the action of air and water on soils, care and production of plants and called for the discussion of animals and had a little to do with horticulture. In fact, it touched in an elementary way on all farming activity.

VISITOR: Does it touch on it enough?

MR. HOWES: If you desire that particular education your boy should go to the Agricultural school. You cannot expect that education if you are going to finish his education in the High school.

VISITOR: I have found that a boy sent to a High school, well, I think they have educated more fools in the High schools than elsewhere, and I would like to know what they educate them in and you said an elementary course in what you mentioned.

MR. HOWES: I said it was not possible in our High schools to give any more than an elementary instruction, and I take issue with you that your Public schools or High schools in the province of Alberta have been educating fools.

MR. SPEAKMAN: I think it would be sufficiently interesting if we could hear this afternoon whether the time has not come that we shall have more

demonstration farms than schools. They are doing splendid work, but are too few, and I am sure it would interest us very much if we could hear if we are going to have any more.

MR. JOHNSTON: Mr. Chairman,—I congratulate Mr. Howes and yourself on your work in agriculture in this province. I think it is a grand work that is being done in the Dominion of Canada to-day in that way. Some months ago I was called to Calgary to find out where the trouble lay in products sold to the consumer for one dollar from which the producer got thirty cents and the Canadian Pacific Railway twenty cents and who got the rest of it. I made some enquiries and made myself notorious by saying it was due to the educational conditions in the British Empire. People were being educated to make money not by producing, but out of the producer, and I say you are doing more in the province of Alberta to solve this difficulty than in any other part of the British Empire. I may say if you go into any of the Public schools, take the city of Nelson for instance, and ask in the higher class what the boys and girls are going to do when they leave school, you will find 95 per cent of those leaving school are going to do something or shove themselves in somewhere between the producer and the consumer. Not 5 per cent. of them will produce, and I have always held that is where the whole root of the evil comes in, and I must congratulate you and your colleagues on this work of education which I think is the grandest work being done in the province or elsewhere.

CHAIRMAN: If I may be pardoned for making any remarks just now I would express my idea with regard to any kind of education is that environment has a great deal to do with it, and if you are going to train a boy to be a lawyer, get him into the law courts where he will have a general idea of the practice. It is generally said that the men who read law at night and do something else in the day never make a success in the business. It would be a poor college that would undertake to turn out medical men merely by teaching them out of a book, and it is absolutely essential that there should be hospitals and different cases with different kinds of diseases and operations and other kinds of things that medical men look after, and that they shall go there and experience the actual work of the thing, and if they do not have this experience and do not live in the environment of the hospitals and medical halls, the college would make a pretty poor business of turning out doctors.

There can be no doubt that agriculture is the most complex of all sciences to-day and a man needs more ability to do hard work on a farm than in any other business to-day.

As far as I am concerned I have had much interest in trying to educate boys in the province of Alberta, so that they would be able to make a living on the farm rather than spending a comfortable time the rest of their days telling other people how to do the things, and for that reason we have established our demonstration farms in connection with colleges of agriculture so that the boys will be in touch with the actual work, not on the large scale as in experimental places, but where things are that a boy can construct and not where we take

young boys and women to college halls and give them habits that they will practise. We take them day in and day out and teach them the best thing they can do is to go on the land and produce more out of it than anybody else has been able to produce, and so we have built our schools of agriculture small institutions of a practical nature. The cost of erection of the buildings; purchasing of live stock; putting land under cultivation; erection of buildings such as live stock pavilion, blacksmith shop and carpenter shop and the equipment of the whole affair, only cost about $110,000, and when that is compared with the millions of dollars lavished on agricultural colleges in other places, it is a pretty humble institution, but for a little over a million dollars we can build ten of these institutions in the province of Alberta. Our experience is that boys turned out in humble circumstances lay a firm foundation for the future.

In the old days one could not travel four miles to get an education at any educational institution, but now the boy is lucky if he rides four miles on a pony to get it. My boys are now riding four miles to get a Public school education. Even after that their chances of getting to High school are pretty slim or to any other kind of an institution.

Our experience with schools of agriculture to-day is that students come within a radius of fifty miles of the school, which shows how far an ordinary farmer boy who is struggling to make his living with his father and mother will go to get his education. We have built farm schools to see how best to serve the boys. We hope to be able to build at least two more in the coming year and I have the ambition to hope that in the next ten years there will be at least ten or fifteen schools of agriculture placed all over the province of Alberta for the purpose of teaching the farmers' sons and daughters the business of what this province can be made to yield.

We have spent millions of dollars in every province in Canada in order to afford boys and girls an opportunity for fitting themselves for professions and entering different lines of business. Is it not time we woke up and instead of giving boys and girls spending money make them not only good and intelligent farmers, but also make them happy and contented in their business of living on the farm?

A man farming near Didsbury a few months ago said to me that he wanted to see if his boy wanted to stay on the farm and sent him to school. He said, "The first winter he went I didn't have much idea he would learn anything. As a matter of fact he wanted to leave the farm and I told him if he would stay on the farm another year or two I would send him to the agricultural school. I figured I was giving him a holiday. I had not much notion of learning farming out of books and he didn't like farming. It was disagreeable to him and I had a job to get him to do his work and I thought if I gave him a holiday in the winter time he would come back in the spring feeling better. Well, no one could believe how he came back last spring. He used to be growling about harrowing the field two or three times before seeding and he would say that all the neighbours would be through seeding before us and that our neighbours would beat us and if we were going to get a crop in at all we had better get it in now. This spring he would not

sow a field until he had it in the proper condition. In fact, one field he would not let me sow in at all. He said he had to summer fallow the whole thing and I am satisfied he did the right thing, and instead of me bullying him around to do the right thing on his land he had the best crops in the neighbourhood and the best crops because he put the labour on it properly."

There is no trouble to put in the labour in any line of business if you have knowledge of what you are going to have when you finish. Hard work never drove any boy from the farm. If he has an interest in his work and had a pure bred cow that was sick, he would sleep in the next stall to it and see it through with satisfaction. It is not any trouble to him to have to go out and give it an extra bite and see that it is all right just before he goes to bed.

Hard work never drove a boy off the farm. They have been driven off because of drudgery. The first thing they hear in the morning at five o'clock is the old man's voice calling them to get up. Then they have to herd a lot of squealing pigs and feed them and they just know that they are pigs and they feed them because they have to feed them. Then they have to attend to some cows which are to them only some other kind of animal, and after feeding some other scrub cattle they come in to eat. Then there is a bunch of horses to feed and then they fall asleep again to dream it is five o'clock and the old man is calling them and the pigs are squealing once more. That is the thing that has driven the boy off the farm. Give him a training in the care of live stock and he will feed the pigs five times a day if necessary, because there is nothing that will respond to feeding as much as the right kind of pigs, and that is the kind of education we want to give to the boys on the farm. We do not want to teach them anything not done on the farm, and not show boys anything that cannot be done by hard effort, that is all.

So far as the great bulk of boys who are going to farm in this or any other country, the only kind of agricultural education to be given is to take the farm environment and have the boys inspired with the knowledge that there is not any business to be compared with farming or that will give men and women the same opportunity in life, the same endeavours, and the same chance for good health and the thorough enjoyment of what they are doing, provided they understand what they are doing and why they are doing it, and provided they know why they have no good or bad calves and know why they grow as fast or do not grow as fast as their neighbours'. These things have to be taught to the boys and girls. The same applies to the duties of girls in the house. What we need in this country to-day more than anything else is agricultural education of a practical nature that will send boys out to work on the land with the knowledge that it is a business worth while; that it is a business they will be proud to be engaged in.

What has driven boys off the farm both in this country and in the United States in the last number of years is because of the newspapers, and we are perhaps not as guilty here as across the line, because newspapers and people who should be using their efforts to get people on the land never refer in any way to the farmer but as "Rube," and they joke and picture him as coming into town chewing a piece of pea straw and he is made the butt of every joke.

That is what is driven into them by every newspaper in the land and that a boy cannot go into society or be anything unless he gets into the city and earns $25 a week and spends $26 a week, and in that way becomes a great man and occupies some great position in the country. We have to get away from that sort of thing and preach the gospel of the land to the boy and the girl for the development of their energies and intellect as well. When we do that and dignify agriculture and give it the place it should occupy in the professions and businesses of the world, then there will be no difficulty about getting boys and girls to live on the farms or to develop the farms. Then this will be the most prosperous province on the face of the land.

By the way, someone wanted to know the relation between agricultural education and the High school and the High school and agriculture. Agricultural education is taught in this province in order that boys and girls shall learn everything they should know. Why grass is growing and the constituents of the earth, and nobody can enjoy the pleasure of the grass and these things without knowing something of why they are grown. Agricultural education is given in the Public schools in order to interest the boys and girls in this thing. To teach them the identification of weeds for instance, as the gentleman from Saskatchewan said this morning, so that when they see them they will call the attention of the hired man or their parents to them and have them destroyed.

I do not think there is anything more instructive than the fact that we have put a weed bulletin in the hands of every teacher in the Public schools of Alberta. Some boys and girls go to High schools and some to Agricultural schools. Those who go to the High school become teachers. In fact, all our teachers must go through the High school. Agricultural education is not put in the Public school for teachers. All the ramifications of agriculture cannot be taught in the High school. The idea is that we shall give them enough training in agriculture so that they will have sufficient knowledge to go out and teach the boys and girls such things as how the plants grow and as to soil, moisture and weeds, and the purpose of putting agricultural education in the High school is largely for the purpose of giving our teachers who are not raised on farms, as a rule, a general training in order to teach elementary agriculture at the schools and not to give them a training in agricultural education for the work of agriculture. The school of agriculture is the same as the legal or medical college that turns out the men for their professions, while the High school is the educational institution that gives the training that will start the boy right in the line of agricultural education. Two years in the school of agriculture and if they want to take a degree in Agriculture to be teacher or scholar, they have to take five years in the agricultural college to fit them to take their degree. I think with four years in the High school they can be taught enough to be able to teach elementary agriculture.

I want to say that Miss Goldie, who has charge of Household Science in the Olds school, will deliver an address on "Household Science for Farm Girls" at 8 o'clock to-night, and all you men who live in the town here tell your women folk to come and listen to this address.

The next speaker on the programme is Mr. A. D. Campbell, who I regret to say is not present.

We will now adjourn to assemble here at 8 o'clock this evening.

EVENING SESSION—NOVEMBER 23rd, 1915

CHAIRMAN: Just before beginning our programme to-night Mr. Rankin our Secretary, has some bulletins which he has received over the wire and which he will read to us.

War bulletins were read and received with interest.

Miss Marjorie M. Goldie, Instructor in Household Science, Agricultural School, Olds, will now address us on "The Advantages of Household Science to the Country Girl."

MISS GOLDIE: Along with the advances in the study of agriculture and the other sciences has come the increased study of housekeeping—more scientific housekeeping or home-making is the aim of the mothers for their young girls to-day. Economy, economy is the cry to-day, not only of funds but also of time and energy. With the higher cost of living and greater demand on the family purse, economical and scientific housekeeping is the cry.

Years ago everything was done in the home, foods were grown in the field and prepared in the kitchen; fabrics were woven and garments made. As years passed these industries gradually went out of the home and into the factory, until to-day little need be done in the home. In the country of a necessity, there are more home industries than in the city, and there the housekeeper must rely more on her own resources.

There are advantages and disadvantages to life on the farm, and one of the greatest disadvantages has been the inferiority of the education obtained by the average child in the rural school. This province of Alberta, being an agricultural province, has not lagged behind in the matter of bettering the opportunities for the education of the country boy and girl. Why in this province, as in other provinces, have institutions been built for the instruction of agriculture and household science primarily? Why have such large sums of money been spent and why is so much being spent in this work? Simply because the study of agriculture became a science, and because the study of housekeeping became a science also. To-day these sciences are being placed side by side with other sciences, and it is claimed by some that if this science of housekeeping were more carefully studied and its principles followed, there would be less need for the services of doctors, dentists and druggists, whose occupations to a certain extent, thrive on the ignorance of the people. When the study of scientific agriculture was first introduced and when firmly established, it was found that the study of household science was essential in ensuring the successful carrying out of the agricultural work.

In years gone by, the work in the home and on the farm was done in the best known way, one worker knew as much about it as his co-worker. To-day

each progressive one is striving to learn more and more, and there is a healthy competition between these co-workers. With the greater advantages of to-day comes the keener competition. The parents are not saying, "What was good enough for us is good enough for our children." They realize the opportunities of to-day and the progressive parents are ambitious for their sons and daughters. They want their sons and daughters to be better prepared for their responsibilities than they were.

For years it seemed that the man had the preference as far as scientific training was concerned, but since then the importance of the woman has been more fully realized. The woman on the farm has been discovered as it were, or perhaps it is that she discovered herself, and efforts are now being made to better the conditions for her there, to make them more attractive and more comfortable. It is for the man to provide or produce the means for livelihood for the family; but even though the man "provide the house," it is for the woman to "make the home." It is her duty and privilege to provide health, comfort and happiness, not only in the house but also in the community. A mother is really a Jack-of-all-trades. If anything is wanted, the mother is the one expected to supply the want. If the child is sick, it goes to its mother. If crops fail, the man looks to his wife. In carrying out the manifold duties thrust upon her, the more the mother knows, the more successful will she be, and the question is: How can a course in Household Science be an advantage to the coming women on the farms—the country girls? The subject is confined to-night to the question of the country girl, not because her city cousins would not also find such studies an advantage, but because the country girls are in the majority in these prairie provinces, and because their city cousins have many advantages from which the country girls are debarred, such as musical and literary treats.

THE VALUE OF SCIENTIFIC TRAINING

Monotony and drudgery are two qualities of housework or life on the farm to which many country girls make objection. They are ambitious, many of them, to leave the farm for city life for variety. Unless they are interested in their work they are not going to make a success of it. The scientific study of various methods creates or develops an interest. Work can afterwards be done with a great deal more intelligence, more interest, and with more success.

After living on the farm for years, conditions at first being anything but ideal as funds are low, but then improving as times become better, one is apt to lose interest, one is apt to jog along in the same old way. "Time and tide wait for no man," and as time passes standards change. To keep up with the times is difficult, but having only one life to live, and not nine as has the proverbial cat, why should not the housekeepers progress along with other scientists, and take the best possible out of life as the opportunities arise? If the future housekeepers have a scientific training, they will be raising their status and will be keeping pace one with the other. Too long the housekeepers' position has been looked down upon, and the girls who take this training and

go back to their own homes will be more looked up to, and should be able to better conditions in their own home and community.

Without any course along these lines it is possible for a young girl to keep house, and it has been proven that it can be done successfully. The aim of a number of housekeepers on the prairie to-day is simply to provide three square meals a day, even as there seem to be some who live to eat. Food, of course, is necessary, but to bind one's self down seven days in the week to peeling potatoes, washing dishes, etc., is a poor existence. Surely there is something higher to live for. The higher culture is very important—to live unto one's self is not the order of the day, though apparently essential in some of the far off farm homes. To be able to entertain your friends is an art, though sometimes in the busy farm life some of the niceties are apt to be omitted. Even though such knowledge is not of everyday use, it is a very nice thing to know how to entertain and what is the right thing to do. This is one of the strong advantages to a course in household science.

The average girl who attends our school is between the ages of fifteen and twenty-five, the years when the character of the girl is being developed, when habits are being formed for the right or for the wrong. I may say that we have had students from fifteen to fifty years, but the average is from fifteen to twenty-five. A girl at this age is very sensitive, and self-conscious, but by daily contact with other girls many sharp corners are rubbed off, perhaps more easily and more effectively than if at home. She observes what other girls are like and unconsciously she has before her ideals which she is constantly imitating or following. On the farm her girl chums are few and far apart. She seldom has any choice, but at such schools at such an age, I think it a great advantage for girls to mix with one another, getting each other's ideas and benefiting from one another.

After asking some of our students just why they came to the school to study household science, I discovered some interesting facts. Some came for one thing and some for another. Some intend practising in their own homes in the near future, some intend teaching it in the Public schools, and there are others who came especially for sewing and dressmaking to enable them to go out into the world and make a living for themselves. Some came for the cooking specially, and what an advantage a scientific knowledge of this subject will be to them. On the good knowledge of the mother on this subject depends the health of the family, also the good nature. Long before the study of feeding babies was scientifically investigated, balanced rations for the farm animals had been drawn up. Ill-health more often is due to improper food than anything else, and a scientific knowledge of proper food for health and for disease, for the infant and for the aged, would be of great value to the rural housekeeper. One mother I heard of just the other day had been feeding her fifteen months old baby strong coffee and wondered why it was sick. There are many good cooks in the country, but there are very few who know the proportions of ingredients for the various food preparations, who know why the various steps in bread making are essential, and who can account for

failures in cooking. That is what these young girls are taught, the underlying principles of bread, cake and pastry making.

Why did some of the girls prefer the sewing? What advantage was it to them? Sewing is an art which seems to be going out of the home as the garments from catalogue houses are coming in. But enabled to make a complete set of garments for herself, the girl increases her knowledge of textiles, develops her originality and in the study of embroidery and in house furnishings, learns how to beautify her surroundings and make them more attractive and homelike. In this country to-day the people are not recognizing nor demanding textiles of proper quality. A low price too often is the attraction, but prices do not always correspond with the values, high prices not always meaning the highest quality. Pure textiles are as important as pure foods, and a knowledge of good qualities ensures more economical expenditures. The young girl to-day is rare who can buy the material and make for herself a complete set of garments, having them tasty, well fitting, reasonable in price and good in quality. But with the training given in this subject the girls are better fitted to choose suitable materials and make their required garments.

Even though they learn to clothe themselves more economically, they must be taught to preserve their garments and laundering is taught them. Anybody can wash, you say. Yes, but there are proper and improper methods, as in other housework. In the scientific study the four fabrics, cotton, linen, wool and silk are dealt with, methods being considered of laundering the white to preserve the natural whiteness and the coloured ones to preserve the dyes, different agents being necessary for the various fabrics and various colours. She is also taught to remove the various stains without destroying fabric and colour.

Woman's realm is in the home, and it is for her to make the home as comfortable, as attractive and desirable as possible. There are many careless homes on the prairie, and our aim is to make the girl ambitious to go back home and better conditions there. More comfort does not necessarily mean more expense. Often some new ideas with a little thought and energy will bring about a transformation. There are too many husbands and not enough homes in the rural community, and we aim to better conditions by giving our girls some appropriate suggestions. Many of these homes, too, are lacking in good sanitary conditions. The ideal is impossible to the average, but in the study of sanitation the girls are given an idea of what should and should not be and we trust some good may result. Owing to unsanitary conditions, improper food, etc., there is much sickness in the rural home as elsewhere, and home nursing is a subject of which every mother should be more or less familiar, it is usually less. All ailments are brought to her, and too often her knowledge cannot cope with the situation. The girls are given a very complete course in this subject, and it should be of great assistance to the housekeeper on the prairie, where the doctor is too far distant for emergencies.

Education should be of a physical nature as well as an educational nature, for unless a woman is fit physically, her troubles will be many. Physical training is essential, and though the average country girl has plenty of exercise

in her daily work, too often the right muscles are not exercised, and she may become stooped or round shouldered. This applies no more to the country than to the town or city girl, but physical drill is often neglected in the rural schools or is not kept up long enough.

The aim of such a course is to develop the young girls, making them fit to take their places as practical and scientific home makers. The ideal home maker should not have her interest only in the daily routine of her work—she should not be weighed down by her household responsibilities. She should be able to take her place in the community, in the social circle and in the literary clubs. For the young boys and girls at the school, literary meetings are held, English lectures being also given, and they are encouraged to do more and better reading during the long winter evenings. Social evenings are also held and these, too, hold an important place in the education of the young girl. She observes the customs of others and profits by her experiences.

Now, there are some who may say the mother is the one to teach the young girl, and some may say "why not let the girl learn how to do things from her mother?" I think the men used to say that about the boys, and some say "the home is where she should be taught." But if the mother has not the information herself how can she impart it to her daughter? The young girls may not make use of all the information every day, but it is nice to know how to do things when the occasion arrives. Some may say, "what the mother knows is good enough for the daughter," but is that progressive?

One writer says, "Knowledge gives power," and whenever one's knowledge on a subject has passed the stage of drudgery and becomes a science, its performance immediately becomes a pleasure. The ability to do a thing in the highest known perfection, or a little better than someone else, is always a source of delight, and it little matters what that something is. Another writer says, "There will be no trouble with the kitchen end of the house when the women take the same pains to know their business as men do." Nothing needs development so much in country life as wise utilization of time, and the orderly, systematic arrangement of work.

Naturally every specialist thinks his or her subject is the most important, but for the country girl a course in household science would give her fresh interest, fresh enthusiasm in her work and knowledge to assist her in every branch of her life work. It would make her fit educationally, socially and physically to carry out the many problems that will be placed in her hands in the days to come. She will be a leader in her community, and I trust that as years go by those whom we are sending out from our school may be instrumental in bettering conditions, making life on the farm more attractive. (Applause.)

CHAIRMAN: We must have conditions in the home satisfactory, and the success of the great majority of the prairie homes is dependent largely upon the heroism of the women who have stayed upon the farm and remained there when the man might perhaps have left and have there made the kind of farm that has something of a reasonable occupation for him. It is very gratifying to know this year that we have over twice as many farmers' daughters attend-

ing our schools of agriculture as we had last year. The farmers are all awakening up to the fact that if their girls are going to remain on the farm and become farmers' wives, it is highly important that they should have the training that will make life much easier or plainer, if I might say so.

I will now call upon Mr. S. S. Dunham, Vice-President of the United Farmers of Alberta, Lethbridge, who is to discuss "The future of irrigation in southern Alberta.

MR. DUNHAM: Mr. Chairman, Ladies and Gentlemen,—After hearing the last address from such a pleasing speaker on such an interesting subject, I trust that you will realize the handicap under which I am put before you and bear with me.

Some time ago I was asked by the Secretary to address this body, and at that time he wrote me and asked me something as to what subject I would be willing to discuss, and among them I happened to mention this subject, but it did not occur to me then just what subject I would speak on. So after thinking upon it for some time, I came to the conclusion that in order to discuss it intelligently, most of my remarks would have to be addressed not to the future, but to the present. Some speaker has said that we have no way of judging of the future but by the past. We have no way of judging the future but by present and past experience and comparing those with what we hope to accomplish in the future.

Now, last fall, I think it was, a number of farmers in our part of the province at different places, invited me to talk to them upon the question of comparative dry farming and irrigation farming. Someone had told them that I had tried both methods and I had farmed enough on both lines to go broke, and consequently they thought there would be a sort of fellow feeling between me and them and I would know something at least of how it happened.

Now, I began having some experience in farming in the southern part of the province in 1906. I took off my first crop in 1906. In presenting that question it occurred to me that a statement of what I considered the most practical way to handle the land at the present time to get the best results would be of interest, so it occurred to me that I could first reach the proposition from an irrigated standpoint by dealing with conditions from a dry farming standpoint. My idea was to show what it would cost to produce returns from farming in our locality on a wet basis on the dry land. I had some land that belonged to other parties upon which I had been hiring the work done and had had considerable experience along that line, also some irrigated land upon which I had hired the labour to produce the crop. I do not say that these figures here —but the intention of these figures really was to be a little favourable to the dry farm—the actual cost of the work I had done in most cases was a little greater than these figures on dry farming, but against that I have given an irrigation farm on the exact figures I used, but these figures are a little conservative.

My idea is to show the comparison if possible favourable to the dry farms. Further than that, I want to show the profit from the dry farm and the profit

from the irrigated farm, allowing a labourer a reasonable compensation for his work, and it was with that in view that I took these figures. This was the most profitable method I had in my experience in getting the best results on dry land in our district. I may say that I don't know anything about dry or irrigated land farming in Alberta except in the Lethbridge district and the only thing I would know would be from general knowledge of what I have read. In the Lethbridge district, I believe, this method would be proper. These figures have been criticised by some able farmers down there. While they differ in some minute details, in the main every successful farmer I have conversed with on the subject says they are conservative.

The first money and most costly was discing after the binder, which being a hard time to get labour cost me 75 cents; that is a double disc run immediately after the binder. The following spring after seeding was done that was summer fallowed at $2.00 per acre. The work necessary to keep weeds down and packing was $1.00 per acre, and all the work was done a year before I got a crop, consequently I had to pay interest on the money invested, which was $3.75 at 8 per cent., which had to be added to that the next spring. The spring work

Irrigation on the Duke of Sutherland's Farm Colony, Brooks, Alta.

varied owing to the way conditions are. I paid on an average 50 cents. Seeding cost me 40 cents per acre. Seed cost me $1.00 per acre; running a harrow and sometimes having to pull some weeds an average cost of 30 cents, and the cutting and stocking on an average can be done for $1.25 per acre. The threshing on the basis of 30 bushels cost me $3.00 per acre and the hauling an average of six miles from the station, which I take it is an average distance for grain farmers, cost 80 cents per acre. The total cost is $12.35 that I paid out for the crop.

Now that was for work for two years. In order to find out how much per acre I was putting on to the land, I divide by two, which gives me my annual cost of farming $6.17 per acre. These figures were compiled last fall. One year with another with that kind of farming you should count, if you get a crop at all, on an average of 30 bushels to the acre. Bear in mind I say, if you get a crop at all. There is one thing a grain farmer must figure on and that is his contingencies. Grain farming is the most uncertain farming there is. The cereal crop is the most uncertain crop on a large scale. There are more gamblers in grain than in any other crop produced. The reason for it is because of the contingencies. Some places one thing and some places another. I have never seen a country where the grain crop or wheat crop was an absolute certainty. I lived in a country where total failure of crops never occurred, but a grain crop frequently failed. The contingencies we have to contend with here in this country are six in number, the serious ones, the serious things that keep us from a crop. Wind in our southern part of the province we have to contend with. Weeds we have heard a great deal about to-day. Winds, weeds and worms—The three W's—it is quite a gauntlet. Drought, hail and frost. Winds, weeds, worms, drought, hail and frost is the gauntlet the grain farmers have to run in southern Alberta. There are some others along the side that are quite interesting occasionally, but as a whole if you get by on those six, you are likely to have a harvest.

Now, I say this is not knocking. I believe that southern Alberta is the greatest grain country in the world, but I believe that excepting some things. Occasionally it is true that we are hit a little harder with the drought down there than you are, but when the time comes for the frost, he gives you a crack that he does not give us, so there is no one that can call the kettle black, and when it comes to this cereal proposition you will find those contingencies coming. Where I was raised we did not have these contingencies, but we had others; we had the rust and we had the Hessian fly and the winter killing and the chinch bugs, so you see no matter where you go these are the conditions of the business and anybody that engages in the grain business must simply count on these contingencies. So prominent are these contingencies in the production of cereals that we must count upon sowing four crops and harvesting three as a rule. I mean four full crops. Sometimes the contingencies do not take the whole crop, but as a matter of risk you can figure on diminishing your yield by reason of contingencies 25 per cent., but I think that is conservative. Some of us fellows by being in the south and not being able to follow the most profitable methods, have been hit heavier than that and lost more than 25 per cent, so I

reduced that 30 bushels to the acre by 25 per cent., which makes 22 5-10 bushels to the acre, and you will notice that comes awfully near to the Alberta average. But bear in mind that in compiling the crop of Alberta you do not get the hailed out crops. You get the report of the threshers. You do not get those things. So that when you see that averages 22 5-10 you get pretty close to the actual conditions. The money value of that 22 5-10 bushels at an average price of 70 cents—I take the average of the years that I have been familiar with the business here—it averages about 70 cents, is $15.75, that is, for two years' return. One year $7.87, and that is your annual return per acre farming in that year, summer fallowing every other year. Bear in mind in that cost is ample pay for your labour. I am getting it.

Now, your profits; you have got your labour and machinery, $6.17, but deduct that from $7.87 and you have a profit on your farm of $1.70 an acre working that way. Land is worth what it will earn; that is a business principle. If it will earn a large amount it is worth a large amount; its value goes up. It also depends upon what money is worth. If money is worth 8 per cent. land is not so high as if money were worth 5 per cent., because one of the great factors that goes into production is the money; money at 8 per cent. earning $1.70 based on a capital investment of $21.25 for your land.

Now, I may say that this estimate during 1915 has been literally knocked all to pieces. The year 1915 has passed all calculations. I know of one man that farmed directly on that plan and he measured his grain and his land, and he actually marketed this year 74 bushels of grain to the acre. The fellow down there in our country that did not get 40 or 50 bushels to the acre has something wrong with him, so that this is evidently entirely out of date, and I believe you know better how things affect you when fellows talk about the same thing all around you. You know how it affects you if the other fellow thinks it is good, why we all think it that way, but I actually believe that estimate is conservative. I think I would like to revise it and make that kind of farming produce 35 bushels to the acre. I am inclined to think it will do that on an average, and in the event of 35 bushels to the acre, the price of your land instead of being $22.00 would be $32.60.

The next plan was to see what I could do, not by a condensed high degree of irrigation farming, but by that kind of farming that a man would devote himself to without a great deal of labour and without going into that class of farming in such a detailed and skilful way such as you could use on small areas, so I took a piece of land already seeded to alfalfa. We have got a start from a different basis, as alfalfa is more or less a permanent crop. These figures are what I hired the work to be done for. My irrigating cost me 25 cents an acre for applying the water. I think in our districts that can be done. I know of one farmer who is a good irrigator and he was sure he could do it for half of that and run the water over it. I actually hired the work for three different years, and in some instances I know the man who did the work made some money on me by sub-letting it to another fellow. The cutting and stacking—I am not so sure that this figure is actually correct—$3.75. I am

not so sure that alfalfa can be properly stacked at this figure, but it can be the way this was stacked, and it was very well stacked.

I was figuring on a yield of 2½ tons. I may say that I made that conservative. I am quite sure that my alfalfa meadows are making more than that. In fact, the only tests I have made have gone considerably over that, and Mr. Fairfield, on the Experimental Farm, has a larger yield still. At $1.50 per ton it cost me $3.75 to put in the stack, which made a total output of $5.45, that is not counting anything for putting the land in alfalfa. As I said before, it is only done once in rotation and once in a great many years if you are not. The question came up what that alfalfa should bring. I wanted to make the valuation low, so that it would not be disappointing to the people who were considering the proposition. I knew that a ton of alfalfa was worth something like 2½ tons of timothy for feeding purposes. I knew that I had never sold from my farms a ton of alfalfa for less than $6.00 per ton in the stack, and the price down there has run from $6.00 to $20.00, $6.00 in the stack.

I came to the conclusion that it would be fair. A ton of wild hay I was told could not be put up to make any profit on it for less than $3.00. I knew it would cost that much to put up timothy at least, and as these hays were the competing hays against alfalfa it would not be unfair to say that the lowest price on which they could be put up would be—judging from the feeding value—a fair basis on the feeding value—that would be something over $6.00 and I decided to be safe on it. We should be able to get $5.50 in the stack for alfalfa.

I count the value of my hay at $5.50 which brings the annual income to $13.75, taking off $5.45 I had $8.30. Land I said was worth what it would earn. Taking it on the same valuation as the dry land, I had an earning capacity of $103.75 on the irrigated land with that conservative value. Now, if the same scale that is prescribed for the dry land were prescribed for the irrigated land, I am satisfied that the yield and quality could both be increased and the value would be increased, so that the yield should be instead of 2½ tons 3½ tons. In that event, my irrigated land on the same basis would pay theoretically, $153.75, so where you count your dry land at 35 bushels it would seem theoretically in our district that water would increase the earning capacity of the land by about 500 per cent. That is, one acre of irrigated land is equal in earning capacity to five acres of dry land. That is theoretical. There are other things which will enter into it. The value of land will depend upon the application of labour and whether labour is scarce. The proportion of labour and the higher skill required on irrigated land might work somewhat against the irrigated land in results, but in our districts, the conclusions I arrived at were that one acre of irrigated land was earning as much as four or five acres of dry land, so we see the value in that regard of the application of water in that district.

Coming down to my subject, the future of irrigable land. Just looking at it from what you would say is a sort of student view, it would appear that the outlook for irrigation was rosy. There are other advantages besides the increase in value. The great advantage is certainty of crop. I have heard

mentioned to-day the advantages of home building. The fact that you may have trees, some fruit, gardens, lawns, all appeal to the home-maker. Some of our people in the Lethbridge district have turned their attention in that direction and the results have been marvelous. On that bald prairie where the tree is of so much value, to find a home with the proper shade and ornamental trees and wind breaks and with some flowers, some fruit, and a lawn, is indeed a wonderful advantage over the home that is built without the application of water. I am sorry to report to you that the farmers who have taken advantage of this feature of irrigation are not very many but some have, and we have as a result a number of beautiful farm homes.

The thing that I want to call your attention to more particularly is that these figures and this apparent advantage of irrigation are more or less theoretical. The grain farmer has the advantage when it comes to marketing the crop that he produces. The grain farmer when he is through that long wait and has run the gauntlet and has threshed his grain and hauled it to town, knows what he has got. As compared with that, however, the irrigated farmer is figuring on $5.50 an acre for his alfalfa in the stack, and his work to a certain extent is just begun. That brings me up to about what I want to say—The future of our irrigated land. It is all well and good to talk about the wonderful crops and see visions of the wonderful future of the irrigation block, and to see what is possible of accomplishment. I like to look ahead a few years and see these blocks the beauty spots of our province, which they should be. I would like to see them dotted with these homes about which I have been talking, populated by comparatively dense population; boys raised on the farm who have been educated in the Honourable Minister of Agriculture's agricultural schools. All of that looks well enough. Why that irrigated belt is capable of maintaining a population of several million people. But in talking about that future, or trying to predict what that future will be, dealing in generalities, attractive as they may be to us, is not the practical point that we have got to settle at the present time. The question of marketing the irrigated products is very complex in comparison as I said with the dry land products. We in Coaldale and the Lethbridge districts have gotten far enough to know what we can produce to a certain extent. The valuable work of W. H. Fairfield on the Experimental Farm by which we have to travel every time we drive into the city has taught us, together with our own experience, that we can produce the results; that we can get the yields; that we can grow alfalfa; that by rotating our crops we can get large yields of grain. Why in 1914 in the Coaldale district, there were crops of wheat that harvested 35 bushels to the acre and Mr. Fairfield with his rotation crop in 1914, produced 64 bushels to the acre, a yield equal to an extraordinary yield on a dry farm, and that was produced in 1914 on an irrigated farm when dry farming was a failure.

We have confidence in what we can produce so far as yields are concerned, but what are we going to do with it? How are we going to turn it into money? Did you ever notice that a farmer is just like everybody else and the old rule that he moves along the line of least resistance applies to the

farmer with as much force as to anybody I know. Why does a farmer like to continue grain farming? He can see through to the end. He knows the road that he has travelled and he can see it clear through, and see the results and what is coming from it. Why does he not take up some of these other lines of mixed farming that we talk about? The road is much more complicated. In some instances he has not travelled the road before and the result is that he is sceptical and does not know whether it is best for him to do that or not.

To-day in the Lethbridge district there are several thousand tons of alfalfa; quite a large percentage of it is not marketable because of it being off colour. Two or three years ago the question came up of marketing our alfalfa. Well, what was going to be done about it? We got together and we formed a co-operative farmers' organization for the purpose of marketing our alfalfa, and after organizing and incorporating it, I happened to be the President of that organization and have been since its inception. We went to work to dispose of this product and we have had remarkable success. We have shipped alfalfa hay from Penticton on the west to Winnipeg on the east, and up to this year there has never been a ton of alfalfa left in the field other than what we wanted to use. This year not a ton has gone out. You men who know business will say it is not good business, that we should not do that, but as I said, the farmer travels along the line of least resistance. If he can market his crop that way he is going to do it with the least trouble. This year we have several thousand tons of alfalfa that is not cut. Right now we are up against the proposition—one of the difficulties in irrigation farming, and permit me to say right here, and I have heard a good deal of talk to-day about production, our education is along the lines of production, and that is all right and proper and I say "Amen" to it, but when you have educated your boy to produce well on the farm, you have only solved half the problem.

The disposition and the marketing of what he raises is just as important as the production. Some gentleman from British Columbia stood up and put a question that he had asked somewhere about marketing a certain product, only 30 cents of which went to the producer and 20 cents to the railway and where did the other 50 cents go to, and I noticed nobody answered that question and nobody yet has answered it. If I were to add a criticism to the excellent discussions that have taken place here, and the emphasis that has been brought to bear upon the farmer's education, if I were to criticise that discussion, I would say it was slighted on the part of the importance of marketing the production.

I assume that there are a number of irrigation farmers here that are in the farming business. That proposition is to-day receiving the very best attention of the United Farmers of this province, but if the United Farmers in this province can serve the grain farmer, if they can serve the grain farmer to advantage—Oh, you irrigating farmer—Oh, you mixed farmer!—you need organization more than anybody. You have got more problems to solve than the grain farmer. His market is comparatively easy.

Suppose we mention the question of dairying. I was talking the other day to an expert dairy-man and we were discussing the question of dairying and he said our dairy industry was in a miserable condition. Why, he said, our competition is away off yonder in New Zealand, thousands of miles across the sea, and yet they have the system down so fine there that they can ship a product those thousands of miles and bring it into our various cities and compete with us and take our market away from us. The work of marketing is a very, very important work. Let us get back to the question of our hay. I don't want to get too far away from our subject. I see Mr. Speakman looking at his watch. I am afraid I have talked fifteen minutes already. He always times me when he and I are together, but I want him to note one thing however, that when the gentleman arranged the programme instead of coupling Mr. Speakman's name with the lady on the programme it was my name. (Laughter.)

On this question of marketing this alfalfa I want to tell you men, and you irrigating farmers, and all of you who are interested in it, that the future success of our business, the future value of our land, the future success of the irrigated projects throughout the province depends upon one thing, and one thing alone. Why, if these gentlemen who were discussing this unfortunate affair at Gleichen had come to me and asked me to settle it, I could have told them how to settle it. I can prescribe to-night the remedy that will make them forget all about the alkali and seepage and frost. You say, what is it? You demonstrate that it pays financially, pays to farm with irrigation and that it is a paying proposition to farm with irrigation and they will forget all about these difficulties with which they apparently have to contend, or else go to work and try to solve it, if you want to make a success of irrigation in this country.

Let me go a little further than that. I want to quote from the Hon. Mr. Duncan Marshall. "A fellow said Dunham said some good things, and the other man said, 'Yes, but, Dunham says so many things it is wonderful if he does not say something good." (Laughter). Mr. Duncan Marshall says a lot of good things, and one of the good things is this; if you want to get people to go on to the land make the conditions on the land so favourable that they will prosper there and that is the way they will go on to the land.

That is the greatest proposition that is before these people as a whole. The greatest asset of the country is agriculture, and if you are going to develop it you cannot develop it by laying the burden of other institutions on it. You must relieve it of its burden and allow it to prosper. Then people will come to your farms. That is the first essential. If irrigation is going to prosper in the future there has got to be some place in Alberta now where it is demonstrated beyond the question of a doubt that irrigation is a paying proposition. You cannot compare it with the States. The fellow will come to look at it and say, "Why are you not prosperous?" If irrigation is a success we must demonstrate that principle. We must be prosperous. We are up against this proposition at Lethbridge. Sooner or later we will solve it. Some day our

thick heads will solve it. We will get to know the feeding properties in alfalfa and we will get to know that there is stock up here that can be taken through this irrigation belt and fed and finished and then shipped on, and there will be plenty of money. I look forward to the time when the Calgary and Edmonton stock markets will be full of grass fed stock, because all that country has got to raise stock for a long time, especially away from the railway, and we can carry that stock into these irrigated belts and by the cheap alfalfa hay we have there, we can finish them and return to the province the increased value for the work or feed that we put into them.

We can serve a mission, serve an end which at the present time we do not know how to do, we actually do not know how, and these farmers do not know. They have not had the experience in the first place. They are not sure enough of the proposition to say to the bank I want to borrow some money. I want to feed some cattle. They have not had the experience. If these men advance as fast as they ought to, they need some attention right now. Offer them sheep, distribute amongst these farmers four thousand lambs. Distribute amongst these farmers in bunches of two or three hundred, as the case may be, and have them fed under the direction of an expert. This would cost nobody anything except the value of the services of the expert. It would teach the farmer the road to the market, and next year he will probably want two hundred or possibly five hundred sheep. Cattle have been selling on the market here at from $5.25 to $5.75 for feeders. If those cattle can be put on to these farms and fed under the direction of an expert who knows his business, why the business of making the irrigation farm prosperous will be greatly augmented. It would help wonderfully. We need that help. We will get it after a while by actually blundering on to it. At the present time we need that experience so as to see through to the market.

I have referred to the dairying proposition. A few years ago we in trying to follow Mr. Fairfield in his rotation of crops planted considerable potatoes. It happened that year that the potato crop, after they were in the root houses, could not be sold practically for any price. I know of one man that put up twelve thousand bushels of potatoes in his root house, and those potatoes were never taken out of there, they rotted inside. The question of market is the important question upon which the irrigation farmer to-day needs help.

We are a long way from the centres of population. The freight question is an important question in our marketing, and when we have over-produced for our local market it re-acts against us very quickly, and the result is we become discouraged, and justly so, so that in thinking of the bright future we have for irrigation, and I don't want to be a pessimist—I am an optimist on the subject—we must not overlook the marketing proposition. In farming, in my experience, in both lines, and I was raised on a farm, and I now say I do not care to farm under any other conditions than irrigation. I believe it the most scientific and satisfactory way to farm where it is available, but I want to emphasize this, that to every person interested in the proposi-

tion, the problem of marketing the products is the problem he has to solve.

Let us learn a lesson from our wheat business. Why does Canadian wheat enter the foreign market and compete successfully with the products of the world? The answer is three-fold in its nature: First,—because the quality of our wheat is equal to the best. Second,—the quantity produced for a given amount of land, capital and labour is sufficiently large to make the production of wheat reasonably profitable. Third,—the business of marketing the wheat is sufficiently systematized as to prevent an undue amount of economic waste. I do not mean to say that in all three of these respects there is not still room for improvement. Is is possible for us to increase the quality of our wheat. Each year we are increasing the quantity by improved farming, etc. Our excellent system of marketing we expect to improve by increasing the storage facilities, at or near the point of production and enabling the transportation companies to have longer time to move it and thus lessen the rate of transportation, but on the whole the system is a success as it is.

Now, what we have done for our wheat we must do for the products of the mixed farmer. If our dairy interest is to succeed as it should our butter and our cheese must be of such superior quality that they will compare favourably with the products of any other country. This we should be able to do without great difficulty but it takes education, it takes system, and it takes time. Surely the quantity of these products must be large enough for a given amount of capital, land and labour to make it profitable to produce them. This we should be able to do with our irrigated land and our alfalfa, but it takes time to breed up dairy herds that will pay, and then we must have our marketing machinery so arranged and so systematized that it will avoid economic waste. Given these things Alberta irrigated land should be profitable for dairying purposes. The same might be said in regard to production of meat products.

One thing more I must say, at the risk of being criticised for repetition, and that is that not only irrigated lands but Western Canada—aye, all of Canada—depends upon the development of agriculture for its prosperity. If this is true we cannot afford to burden this great source of national prosperity with unnecessarily supporting any other industry. We must compete with the world with our products, hence our machinery, our transportation, the money that we use, and the supplies that we buy must all be furnished to us at a price as low as is consistent with good business.

Given these conditions the future of irrigation in Western Canada is assured. Given these conditions, these different irrigation blocks, consisting of more than a million and a half acres, will in a few years be peopled by a prosperous and happy people and will become the beauty spots of the prairie.

Ladies and gentlemen I have detained you too long. There is much to be said and more to be done along the lines indicated by my subject but I trust enough has been said to cause some thought, and at some future time I will be pleased to continue the discussion further.

I thank you.

CHAIRMAN: The Resolution Committee will meet here to-morrow morning at 9.15 A.M.

This brings us to a conclusion of our programme for to-night. I think Mr. Dunham's discussion one of the serious features of the farmers' business, and while nothing was said about discussion of his address on the programme, it is not very late and I would be glad to hear from any person here with respect to this question, because there can be no doubt about the fact that if this province is to develop and become the exporting province of farm produce that we hope it will, the question of finding a market for the thing the farmer grows, or helping him to find it, is just about the most serious problem we have under advisement at the present time. If any person has anything to say I will be glad to hear them.

MR. LAWRENCE: As having some experience in irrigated lands and growing fodder, grasses, and such like, I would just like to say that the most serious aspect of Mr. Dunham's speech to my mind was, that only producing say two tons of alfalfa to the acre, was sending that produce to Penticton and Winnipeg. If he is only producing on that land that quantity of the finest fodder plant that is known to-day and under irrigation, it seems to me that his land must be starved for the want of humus (the manure) to make that plant grow and produce part of your crops. That to sell what he is producing, to send it away that distance—of course distances do not matter much—but to find distant markets like that when every ton of that produced ought to be fed at home in order to feed the land and to make it produce anyway from four to six tons to the acre under irrigation, it seems to me to be the most serious part of his farming operations. I might say a great deal more perhaps but alfalfa growing is to come up to-morrow, and it may be that with the other side of this thing, a different aspect may be put upon it to that presented by Mr. Dunham. The serious part is, producing that small quantity of alfalfa under irrigation and then selling it off the land.

MR. FREYBERGER: I came from a section of the country that grew a great deal of alfalfa. In fact I think it was the banner alfalfa state. I moved there in the spring of 1904, and stood in my back door there one day and counted two hundred hay stacks that were absolutely worthless because of the reason Mr. Dunham has stated. There was no market for it. Some parties shipped it to Kansas City and got the bill back for the freight. It would not pay the freight although good in feed value. When I came from there in 1912, there were five or six alfalfa meal mills established in the county. The one in our town was grinding on an average during the busy season, one hundred tons of hay every twenty-four hours. For that hay that was not worth anything, the farmers were getting from $7.00 to $10.00 a ton. A market was opened up for it in various places. I suppose every one here is familiar with alfalfa meal and perhaps has seen it. In addition to that, there were thousands and thousands of sheep fed in the county of late years and the result was that in place of seeing any alfalfa hay left over they went around and

bought up the alfalfa that was left after threshing, and everything had a value, and to-day it is one of the great industries of the country.

That can be done here. There is no reason why it can not. They have mills that they move out to the stack and grind just as you do a grain stack, and it is of better value than bran. I believe it is higher a little in protein value than bran, and I believe that with a little co-operation and a little effort that can be obtained here. I believe, however, the best results can be obtained by feeding it to stock. I believe that is the solution, but I notice here in Alberta, the marketing of lambs for instance, there is very little difference in the price of mature or fat lambs and sheep. I apprehend the market for good juicy lamb meat has not been made. That will come I believe, in the future. I would like to see the day when it is possible for a man to go to the bank or meeting house and get what money he needs to buy up stock to feed and put on his farm. I believe that day will come and I will be glad to see the time when we have a market right at Calgary or Edmonton, or some place close to sell this fat stock, and to see these irrigated farms the finishing places for stock grown on the ranges, and I believe these things will come with a little thought and patience.

MR. JOHNSTONE (Nelson): This is very interesting to me. I have been in the fruit growing business for a number of years. I have found the solution of it and it is very satisfactory. I have been bringing the producer and consumer together. A few months ago I visited Calgary and visited the offices of the United Farmers of Alberta, and I told them what I had and since then we have been mutually co-operative, and I noticed some I met the other day looked a lot younger after I had shipped some of my cherries in. I know I ship a great deal of them in.

I come here among you as a delegate from British Columbia, as a delegate for the Associated Boards of Trade of Eastern British Columbia. Now, they are at present your nearest and best market, and I know my friend from Kamloops will object to my bringing it in now, but I want to say that I come with the most hearty invitation for this Congress to meet next year in Nelson, where you will bring the producer and consumer in closer touch than they have ever been before, and I can guarantee that you will enjoy the finest time you have ever had and you will all like your visit and my cherries.

MR. FAIRFIELD: I want to say a word to correct any misapprehension of Mr. Dunham's remark, which I think Mr. Lawrence has drawn. As I understand Mr. Dunham, he mentioned a minimum yield of five and a half tons of alfalfa hay to the acre as a basis to compute his values on as compared with dry land results. I might say as an actual fact, in seven years, raising of alfalfa under irrigation at Lethbridge, we have weighed the hay from every piece we have cut, and the average for the last seven years has been over five tons of cured hay to the acre. Mr. Dunham spoke of feeding from the stack. We all know that in fully cured hay there is some shrinkage between that and what you can pull out of the stack, but allowing for that we have still four tons of

hay that would be quite safe to count on providing a man gave reasonable and good attention to the workings of his land and the application of his water.

MR. DUNHAM: I want to say that the comparison I made was as I stated, the minimum yield on the irrigated land; and I also tried to be a little on the other side in the dry land. That is the reason I made the figures as they were. The only measurement I made on the farm, I thought, in an average year, was measuring out of the stack, which was sold in winter time and which was a little better than four tons to the acre. I was putting this conservative valuation to find a basis from which to get a comparison of the two methods of farming.

MR. DON BARK: This is touching a rather delicate chord with me, that is, the product of irrigated farming. I have only been here since May and I came here to stay and I think you will see more of me from now on. I have had some experience with irrigation and the marketing of the irrigation products, and I want to assure you that it is one of the problems that confront the irrigator to-day. I have seen some irrigation projects grown up from infancy. They have a habit of growing up in the United States that is sometimes too fast for their own good.

I have one project in mind in Idaho, that of the South Side Twin Falls. I was the pioneer there some ten years ago. Some of the farmers who came in there from different parts of the States seemed to think the only problem was to get the land in cultivation and crop, and they fell over themselves to get it in crop. I was working for the Twin Falls Land Company; that was after having spent several years in government service there. When I first went in there I had to pay $20.00 a ton for alfalfa, and it was pretty poor stuff then, and they would seem to weigh it half green in the harvest and when you bought it six months later you could almost blow those bales away. Then we all thought we would get into alfalfa quick, and the whole project seemed to go into it, and it was not long before half of the project was in alfalfa, and the prices went down, down, and I put my farm into alfalfa and I was counting my chickens before they were hatched, and it brought tears to my eyes when I had to sell my alfalfa for $3.00 a ton in the stack. That problem has been solved and the solution has been worked out by diversification of crops.

It will work it out at Lethbridge, and it will work it out here. Four years ago, half of the project was planted to alfalfa. In 1915 only fifteen per cent of the cultivated area was in alfalfa. They have 200,000 acres in the project, and some 15,000 dairy cows there. The sheep men from the hills drive in their sheep in the winter to feed them because they know they can get cheap hay, or get it at a reasonable price. There have been 200,000 sheep fed there every winter for the past five years. Some farmers are raising clover seed. There were 15,000 acres of clover seed raised there last year. There is a lot in wheat and a lot in potatoes, and the thing is being worked out in a very fair way. That is about all I want to say along that line. That is what is going to work

that problem out here. Hail or frost will not be such a bugbear and a poor year for any one product or live stock of any one particular kind will not hurt us very much. So, ladies and gentlemen, pin your faith to diversification of crops.

DELEGATE: I would like to ask you, gentlemen, if alfalfa is practical on dry land in Alberta. Now, some years ago Mr. Cameron sent one of his agents to Pittsburgh, and that reminds me of the story of the little boy that came running in to his mother one day crying, "Oh, mother, mother, come out and see the lion," and the mother said—"You know, Willie, that is only Johnny Smith's big yellow dog". She sent her little boy upstairs, telling him not to come down until he had prayed to God for forgiveness. It was not very long before the little lad came tripping downstairs and said, "I prayed to God and he said 'that is all right little boy, you run on downstairs and play, for that very dog fooled me once' ". Laughter).

I would like to know—we are in to this dry farming business. We have heard nothing but irrigated farming, but this fellow fooled us into dry farming and if irrigated farming is what we should follow he has fooled us, and I want to know if alfalfa is practicable on dry farming. We tried it this year.

MR. DENNIS: Where?

DELEGATE: Eight miles north of here. We tried it out and this year we had very good success, and I brought a bunch in and had a placard put on it "Alfalfa grown on dry land", and do you know, that placard was removed and I don't know whether there was any object in doing so. (Laughter). We are doing the best we can, and I measured some of it and it was two feet and seven inches long, and it was produced on that land. Whether it is worthless or not, I don't know. We seeded it on the 10th of June. It was not up to the ceiling like some others that I notice here, but I thought I would show what we could do on the dry land. I would like to know whether it is practicable.

Another thing, a gentleman mentioned packing, and I would like to know whether that is beneficial. I am not kicking at Mr. Cameron on the business. We had an average of 42 bushels of wheat on 100 acres, but what I am trying to get at or get information on is that there was a 40 acre piece of that land that I have not any doubt, and neither had the threshers, at least they said so, that it produced sixty bushels to the acre. Now the other part of that, what was the trouble? The land that produced sixty bushels to the acre was ploughed in some time in May last year and worked down. The rest of it was not ploughed until after the snow, and not worked down until this spring, but what produced the good quantity of wheat was packed with a heavy packer and the other was not, and I would like to know whether there is any difference in running that packer. I am not a practical farmer, I have practised dentistry for thirty years, but the agent got me and I am up here and have my shoulder to the wheel and I am working hard at it. I want to know from

some of the practical farmers here a little about these two lines. There is no use in my spending my time and money in planting alfalfa if it is not practicable on dry land.

MR. DENNIS: Was it newly broken land?

DELEGATE: This is about the third crop. There is only about 2½ acres perhaps, but the question is whether I had better risk any more.

MR. DENNIS: Mr. Fairfield could probably answer your question better than anybody else because he is operating a farm under the same conditions.

MR. FAIRIELD: I may say it comprises four hundred acres; 200 under irrigation and 200 devoted to working under dry farming conditions. The rainfall probably is somewhat similar between Medicine Hat and here. My impression is that it is very similar. We have found it does not pay to sow alfalfa on dry land when sown in the ordinary way, that is a question of cost. But when sown in rows far enough apart to cultivate between we have found it profitable, not only to raise for hay—the yield will be less on dry land—but it is a money crop when raised for seed. However, the alfalfa seed crop is always a fickle crop.

The idea of planting in rows is this, that moisture between is the controlling factor when we strike a dry season, and we only receive moisture enough to grow the alfalfa eight or ten inches high; it is not practicable to cut and rake that up because it is too short, but if we can get a good stand, but just twice as thin, then, instead of having it ten inches high, we will have it twenty inches high, and we will get a crop that we can handle. Of course it is not practicable to sow it thin, because weeds will come in, but if planted in rows where we can cultivate between, we can control the weed problem and keep them out and grow a crop that we want to grow.

Referring to the question of packing I may say that from my observation the character of the soil, I believe, decides whether packing is necessary, or whether packing will pay; or to put it the other way round, certain soils pack up better than other soils. With the soil on the Lethbridge station packing has not paid when summerfallowed for instance, in summer. The surface cultivation we can give even with one horse we find that the horses' feet going over the land makes it sufficiently firm if following spring sowing, so that we can get no advantage when we plough in the fall. On the other hand, if land is ploughed in the fall we sow in the spring.

MR. ABBOTT: As to growing alfalfa on dry land, I can say that seven years ago I seeded the first piece of alfalfa with Montana seed in the driest part of the Northwest. So under those conditions if we can grow alfalfa on dry land you will certainly grow it on this long irrigated field between Calgary and Medicine Hat. I tell you I started seven years ago and I didn't know anything about it, and in fact I consulted Mr. Fairfield a year after and he could not tell me anything about growing it in rows. I have grown it since. I have 12 acres of alfalfa that with the exception of last year, gave

me about 3 tons to the acre. This year I got 65 tons off of 12 acres and let me tell you too, although it sounds a little like boasting, that it was dry alfalfa, or alfalfa from a dry farm, that went to Denver and beat all the alfalfa from irrigation districts.

CHAIRMAN: Now this brings us to the end of our programme. I have an announcement or two to make; one is that a meeting of the Executive of the Western Canada Irrigation Association will be held here at the close of this meeting, and another is that a meeting of the Credential Committee consisting of Messrs. Fairfield, of Lethbridge, Brown, of Kamloops, and Abbott, of Maple Creek, will be held at the conclusion of this meeting. You who are interested in soil crops will, I think, find it worth your while to look over the exhibits of vegetables displayed in the Soils Products Exhibition Hall, in the next building.

I declare this Convention adjourned to meet to-morrow morning at 9:30 o'clock.

MORNING SESSION, November 24, 1915.

CHAIRMAN: This programme has been changed a little. This forenoon will be devoted to alfalfa. Because of the different features on which the three speakers will dwell, we have changed their order.

We are first going to call upon Mr. S. G. Porter, of the Irrigation Branch, Department of the Interior, Calgary, to discuss "Alfalfa, the basis of successful irrigation farming."

MR. PORTER: Mr. Chairman, Ladies and Gentlemen,—In presenting this paper on the subject assigned me I will not contend that irrigated farming cannot be successful without growing alfalfa, but I will contend and endeavour to emphasize what I believe to be a very important fact, that the growing of alfalfa is an almost unfailing index of success under irrigation. The farmer who has been successful without alfalfa will be more successful with it. On the other hand, the farmer who is prejudiced against it or opposed to alfalfa growing is most likely opposed also to rotation of crops, the raising and feeding of live stock on the farm, and is indifferent to the conservation of soil fertility. It is for these reasons that I state that alfalfa growing is the index and basis of success in irrigated farming.

As a broad definition of the term "successful farming", let us agree that it means:

(1) Making a home on the farm.
(2) Making a living on the farm.
(3) Making a profit on the farm.

My duty now is to show what part alfalfa plays in attaining these objects.

MAKING A HOME.

The primary object of a farm is to make a home—not just a place to live —for the farmer and his family. That is not done in a day nor in a year.

Permanence must be the fundamental idea. The man who plans to exploit the soil by a few years of grain growing is not making a home on the farm and he should not be called a successful farmer, even if he makes money in the process. Unless he expects to stay on the farm he will hardly consider it worth while to spend the time and trouble of preparing his land for alfalfa and establishing a rational system of crop rotation which will properly conserve the fertility of his land. The planting of alfalfa is, in itself, an indication of permanence and as such is a move in the direction of real home building.

MAKING A LIVING.

Farm home-life should be the most comfortable and the most independent life possible. But to make it so you must have real cows and not canned milk; real pork and chickens and eggs, not Chicago cured or tinned meats. In other words you have got to have cows, pigs, chickens and the other essentials for comfortable living. It is amazing how many farmers fail in this. And the one reason above all others responsible for it is the one-crop system of farming. A proper diversity of crops and the feeding of live stock on the farm is the logical remedy.

Here is where alfalfa comes in strong. It is the best all-round feed in existence for cattle, sheep and hogs. If it is given the prominence it deserves and other crops are grown in a rotation system which will properly balance your farming and feeding requirements, you will have the essentials for a comfortable living, not a mere existence.

It is a good individual principle and a good national policy to be self-supporting. Let us adopt this as a slogan:

Make Canadian farms feed Canada.

Make Alberta farms feed Alberta.

Make your farm feed you.

MAKING A PROFIT.

While making a profit is not the chief purpose of life nor of farming, still it is the accepted measure of business success. How to make a profit out of the soil is the farmers' business problem.

"Every farm is a factory," and "the fertility of the soil is the capital stock." How to make the factory most productive is the proposition. You certainly cannot draw on your capital stock to pay dividends. In other words it will not do to fool yourself into using up your soil fertility and calling it profit. The capital stock, or fertility, of Western Canada's soils is nearly always rich, but it will not continue so under the usual one-crop method of farming.

To make farming profitable then, soil fertility must be maintained. Let us examine the requirements and note the importance of alfalfa in maintaining it.

There are some thirteen elements used as food by plants, the principal ones between nitrogen, phosphoric acid and potash. Nitrogen is in many respects the most important. It is absolutely essential to plant life. If the soil

does not contain it, it must be supplied. At the same time it is the most costly element to be supplied if the farmer has to buy it and put it in the soil. Being also more soluble than the other elements it is more easily washed out and is usually the first element to become exhausted. Therefore, its continual renewal is an absolute necessity in maintaining soil fertility.

There are three principal means of restoring nitrogen to depleted soils:

(1) The use of commercial fertilizers. This is very expensive and under the conditions which prevail here unnecessary.

(2) The application of barnyard manure. This is very important and even more valuable than is commonly recognized.

(3) Growing leguminous crops such as alfalfa or field peas which take the nitrogen from the air and store it in the plants.

Alfalfa in common with other plants known as legumes requires much more nitrogen than other crops, but fortunately they have the faculty not possessed by other plants of absorbing a big part of their supply from the air. Instead, therefore, of depleting the soil of its nitrogen, they add to it. The alfalfa plant is rich in nitrogen and if ploughed under as a green manure each ton has the value of four tons of barnyard manure. But nearly one-half the weight of the alfalfa plant is in the root, so that it produces a green manure crop under ground in addition to the hay crop above ground. It thus lessens the necessity of ploughing under a growing crop for manuring purposes. If in addition to this the hay crop is fed on the farm and the manure returned to the soil, there is no necessity of ploughing under a growing crop in order to preserve the soil fertility.

The second argument for alfalfa is conserving soil fertility and making farming profitable is its importance in crop rotation.

Crops have different food requirements. The long continued growth of the same crop exhausts the food elements particularly adapted to that crop and unless these elements are restored, crop returns will invariably diminish. The dangers of plant disease and insect pests are also increased where the ground is used over and over for the same crop. Hence the advantage of crop rotation.

From the standpoint of their effect upon the soil and the yield of succeeding crops in rotation, crops may be divided into three classes, namely: Exhaustive, such as grains and flax; stimulative, such as potatoes and other tilled crops; and restorative, such as grasses, peas, clover and alfalfa. Alfalfa is the best restorative crop for irrigated land. It leaves the soil in better condition for the crops that are to follow than it was before.

The irrigation farmer has a big advantage over his dry-farming neighbour in respect to carrying out an ideal system of rotation. To be most successful the system must include alfalfa growing and alfalfa demands irrigation. But rotation alone, even where alfalfa is included, is not sufficient. The ground needs manure. Therefore, if you will add stock raising to the alfalfa growing you have the fundamental requirements for a successful system.

A programme which includes alfalfa growing, rotation of crops and live stock feeding, furthermore, is an indication of system and better business methods in general as well as better farming in particular. It requires definite planning of work in advance, together with more intelligent estimates of outlay and returns. The one-crop system means not only poor soil but poor people.

My third argument for alfalfa is its high feed value for live stock. I have already pointed out the necessity of raising live stock on the farm and utilizing the manure in order to maintain the fertility of the soil and make farming profitable. I wish to emphasize this a little further.

(1) Feeding your crops gives greater profits. While alfalfa sold as hay will usually prove more profitable than grain, it is not as a hay crop directly that the big profits are made. When fed to live stock the returns are three or four times as great as when sold as hay and when the manure value is added the ratio runs up to five or six. For milk cows alfalfa is equal to bran and can be produced at one-fourth the cost. It will add from 15 to 30 per cent to the profits of dairying over the use of any other feed you can raise or buy. The returns when fed to dairy cows, are often as high as $25.00 to $40.00 per ton in addition to its direct and indirect fertilizing value.

If you would market your crops to best advantage, manufacture them into milk, beef, pork and mutton. "Grow what you feed and feed it. Don't sell it."

But you may object that there will be an over production of alfalfa if the principles I am advocating are carried out. There is no crop which presents less danger of congestion and over-supply in Western Canada than alfalfa. The ease with which it can be handled by the farmer himself without elaborate or expensive equipment and the many profitable uses to which it can be put make it less likely that the alfalfa grower will find himself at the mercy of congested markets and overcrowded transportation facilities than the grain grower, the fruit producer or any other one-crop farmer.

The greatest returns accrue from feeding it on the farm and it is essential that the stock feeding industry be developed parallel with alfalfa growing. But that is not the only manner of disposal. Wherever the supply exceeds the normal local demands, the alfalfa can be ground into meal for shipment to eastern markets at a profit both to the farmer and to the miller. The establishment of alfalfa meal mills will give a cash market at profitable prices for an almost unlimited amount of high grade alfalfa and at the same time materially assist in the industrial development of the community.

(2) Feeding live stock utilizes much roughage for which there is no market. It makes use of the by-products of farming. Remember it is the use of the by-products of big industries that have made men rich. Where no live stock are fed there is a tremendous waste on the farm which should be avoided.

(3) It returns the fertility to the soil and makes bigger crops. No soil is so fertile but that continued cropping without returning plant food to it in

some manner will eventually ruin it. I am still speaking on the general topic of making a profit on the farm. I have already pointed out that you cannot use up your capital stock, which is your soil fertility, and call it profit. Before determining the profits from any crop produced on the farm it is necessary to estimate the loss in fertility to the land which produces it. This factor is too often disregarded. Profits in farming are more dependent upon soil fertility and its maintenance than upon any other factor.

Each crop taken from the soil removes some of its fertilizing constituents. At average prices of fertilizers a bushel of wheat removes from the soil 26 cents worth of fertility; a bushel of oats, 13 cents worth. If you grow 25 bushels of wheat or 50 bushels of oats per acre and sell them as such, you are selling $6.50 worth of fertility from each acre of your land and reducing your capital stock by that amount. Likewise with other crops in varying amounts.

Now it has been demonstrated scientifically that when grains and hays are fed to farm animals from 80 to 90 per cent of the fertilizing constituents of the foods which are fed may be recovered to the land. This means that of the $6.50 worth of fertility taken from the soil, more than $5.00 worth may be returned. In other words you are recovering in manure value alone an equivalent of nearly 20 cents a bushel on your wheat and 10 cents on your oats.

But grain alone cannot be utilized in this way even if there were no other drawbacks to continuous grain cropping. On the other hand alfalfa in addition to its general advantages in crop rotation and soil fertilization is the best farm stock feed in existence.

While it requires about the same amount of fertilizing constituents to produce a single ton of alfalfa as to produce 25 bushels of wheat or 50 bushels of oats, the fact that a big part of it is drawn from the air and from the subsoil below the reach of ordinary crops explains why it does not deplete the soil fertility in the same ratio as other crops. A three-ton crop represents about $10.00 worth of fertilizing constituents per acre and when fed on the farm returns $30.00 per acre. Now the beneficial effects of growing alfalfa in rotation with other crops more than outweigh its consumption of fertilizing constituents in the soil, leaving the indirect gain acquired through the return of manure to the soil as a clear credit to soil fertility. It may appear to be an extravagant statement when I say that the fertilizing value of the manure from a ton of alfalfa fed to stock on the farm is $10.00, or that an acre of land producing three tons of alfalfa will return $30.00 worth of fertility to the soil when fed on the farm, but scientific investigations have proved that it is true.

Mr. W. J. Spillman of the U. S. Department of Agriculture says, "No system of agriculture has ever been permanently profitable without the use of domestic animals as a means of maintaining the productiveness of the soil."

(4) Raising and feeding alfalfa means living on the farm. Live stock raising cannot be left to other hands. The owner must give his own time and attention to it. Such operations are primarily adapted to the small farm personally conducted. And when a man makes the farm his home and deter-

mines to have a real home with the comforts which he is entitled to, he is going to interest himself in putting up better buildings and making the place more attractive than he would for a tenant. He is also going to co-operate with his neighbours in having better roads, better schools, better social advantages, a better civilization. Co-operative organizations for better markets become possible and a prosperous community is built up. These things do not come in a community of large non-resident holdings operated by tenants or hired men on a one-crop system of farming.

(5) Alfalfa growing and stock-feeding distribute labour more uniformly through the year.

I have stated that every farm is a factory. It is a business proposition and must be conducted on business principles. One of these principles which must be given due consideration is the steadiness of employment of your labour and capital. The factory that runs only half time or at half capacity is not likely to be profitable. The one crop farmer is doing both these things; then how can he logically expect success? So long as he neglects proper rotation methods and the utilization of manure from live stock feeding he is working his factory at half capacity. So long as he is crowding the operations of the entire year into a brief working season he is working it on half time. No other business would expect to succeed under such conditions. Are we not safe in concluding that this is the principal reason why farming is not more successful? A system that leaves practically the entire plant, including expensive equipment and work stock, together with his own time and labour, non-productive during a long period each year cannot be an efficient or profitable system.

Fewer acres of land and more live stock, a diversity of crops, with a few cattle, pigs and chickens, and a few good dairy cows will give profitable employment the year round for all members of the family, produce a steady income and a comfortable, independent home life on the farm. (Applause)

MR. SPEAKMAN: Will you allow me one remark on the address delivered? I cannot help saying it is a most splendid address. There is only one point I want to speak on and that is regarding the alfalfa meal. The speaker said we would have good markets in the East, but it did not appear in our addresses that we have made any success in this direction, but it has been ground in southern Alberta and has not had to be sent east to the market. It has been shipped to Red Deer to feed stock there, and I think if it develops on irrigated farms in southern Alberta as I expect it will, when it increases we will have a considerable market right in Alberta when that alfalfa meal is forthcoming.

MR. JOHNSTONE: I would like to know what results have been obtained by growing alfalfa in an orchard. A good deal of discussion will take place on that line, likely, but I would like to hear some information about it.

CHAIRMAN: Mr. Fairfield is the next speaker, and he will probably be able to say something on that. Mr. Fairfield will discuss "Crop rotation on

irrigated land". I have now much pleasure in introducing Mr. W. H. Fairfield, Superintendent, Dominion Experimental Farm, Lethbridge.

MR. PEARCE: I would like that the Secretary should read the Resolutions that have been before the Resolution Committee, owing to the fact that one gentleman who has moved a resolution has to go away at one o'clock, and might wish to say something.

CHAIRMAN: We will have the report of the Resolution Committee before Mr. Fairfield makes his address.

Moved by S. S. Dunham,

Seconded by G. R. Marnoch,

Whereas, the majority of the farmers in the proposed Lethbridge Northern Irrigation project have already expressed themselves as being desirous that this project should be carried into effect at the earliest possible date, and,

Whereas, the extraordinary high yields of grain this year throughout that District have confirmed by practical results the latent fertility of their lands when supplied with necessary amounts of moisture, and,

Whereas, their experience in past years points to the probability that in future years, there may be deficiency of moisture, and,

Whereas, these farmers are satisfied by their visits to the farms in the irrigation districts south of Lethbridge that they too could grow highly profitable crops of alfalfa, hay, etc., and insure crops on such lands as they might retain under grain, and,

Whereas, the preliminary surveys carried out by the Irrigation Branch of the Department of the Interior have demonstrated that irrigation facilities could be extended at reasonable cost to other areas east and south of Lethbridge in which soil and climatic conditions are similar to those in the successful Lethbridge Irrigation district, these areas totalling approximately 350,000 acres, therefore be it,

Resolved that the Western Canada Irrigation Association respectfully urge the Dominion Government to diligently proceed with the surveys in the districts indicated, so that the farming communities may be enabled to proceed to take steps to avail themselves of the benefits of irrigation without any avoidable delay.

And the Association directs that, copies of this Resolution be forwarded to the Premier, Sir R. L. Borden and to the Hon. Dr. Roche.

CHAIRMAN: You have heard this resolution read and recommended by the Resolution Committee which has been moved by S. S. Dunham and seconded by G. R. Marnoch. All in favour will signify their intention by raising their right hand.

Carried.

Moved by C. W. Peterson,

Seconded by N. S. Rankin,

Whereas irrigation development in the prairie section of Western Canada will necessarily depend upon the extension of animal husbandry in all its branches, and

Whereas the history of irrigation development elsewhere indicates that alfalfa is overwhelmingly the most important and remunerative fodder crop produced under artificial watering.

Therefore be it resolved:

(1) That the Dominion and Provincial Departments of Agriculture of Alberta, Saskatchewan and British Columbia be petitioned to initiate a widespread system of popular co-operatve experiments with alfalfa on the basis of supplying seed to such farmers as have available well prepared and otherwise suitable areas under irrigation.

(2) Such plots to be of a minimum area of five acres and the preparation of the land, seeding, inoculation, and further treatment to be performed under the direction of departmental experts.

(3) That at the end of the season reports upon these plots, properly illustrated, be published and mailed to all holders of irrigable lands.

(4) That a well directed and energetic educational propoganda be initiated by the Departments of Agriculture to convince settlers on irrigated lands generally that the only road to complete success lies through the alfalfa field, into the breeding and feeding of live stock.

(5) That copies of this resolution be sent to the Dominion and Provincial Ministers of Agriculture affected.

CHAIRMAN: So far as the province of Alberta is concerned this is not necessary. We began this propaganda in connection with alfalfa over a year ago, and we decided that the best way to get it grown in the different parts of the province was to aid alfalfa, and we offered three prizes in our schools of agriculture to the boys who grew the best bushel of alfalfa seed, and some seventy or eighty boys began growing alfalfa seed under the Professors of Field Husbandry in each of the schools, so that now these boys have plots of alfalfa growing from Athabaska on the north to the southern portion of Alberta. These are being grown by boys under the direction of Professors in Field Husbandry. We started in well by getting Alberta grown seed so as to get seed native to the province, and Mr. McGregor, who is in the room today, was good enough to make a present of the alfalfa seed to the boys. I think as far as our province is concerned, we have started the propaganda pretty well. I don't know what the other provinces have done. It will do no harm to pass the resolution. However, it is a good thing to tell the Governments what to do.

Resolution carried.

CHAIRMAN: Now, we will call upon Mr. Fairfield for his address.

MR. FAIRFIELD: Mr. Chairman, Ladies and Gentlemen: Mr. Porter in concluding spoke of the advantages of being able to give employment the year

round to all members of the family. When I was a boy living on the farm and happened to hear such a statement, it gave me the same depressed feeling I used to have when I heard that old hymn entitled "Every Day will be Sunday by and by."

I used to think there was enough work already and it was not until years later when I was farming for myself on a straight grain farm that I began to realize the real significance of remunerative work in the winter. When the crop was threshed and sold in the fall it took about all the returns to straighten up back accounts. Then there was a whole year with practically nothing coming in, and try as we would to economize, the debts that would have to be liquidated with the coming crop would pile up. One day in the early part of a certain winter a milk vendor came out to see if he could get some milk from us, and we agreed to let him have the product from the half dozen cows we were milking at the time. We began giving the cows special attention with reference to their feed, and at the end of the first month, received a check for $60.00. We also received with it an impetus to do a little thinking, the result of which was that from that time we never had to draw on the money received at threshing time to pay operating expenses.

In introducing my remarks on a subject dealing with diversified farming, I am sure you will pardon me for making this personal reference, but it was just this experience that first taught me the advantage of a winter revenue as well as enough each month in the summer to pay all current operating expenses. But mark you, it was the revenue that appealed to me, not the work, although one finds oneself accepting that quite complacently.

In passing, I might add that I can think more philosophically than I could as a boy concerning all those Sundays in the "by and by", for I fancy we will be provided with something more remunerative than straining our energies at finding something to do that was not forbidden on the Sabbath, as was the case when we were children.

The previous speaker has shown most clearly the need of crop rotation in a system of farming that makes for permanency and stability. Our country is too new for us yet to see many examples of the evils of continuous grain growing, but for such we have only to look at the history of the older farming districts on this continent that started as we are doing with all the natural resources that a virgin soil can offer.

The thing about a proper rotation that really appeals is not that it is the right thing to do, but because it pays. It is a similar case to those cows I was just speaking of. We found they paid so we stuck to them. So with crop rotation, when a farmer starts along proper lines he finds it pays and he sticks. So in discussing rotations suitable for irrigated land in southern Alberta, we propose to view the question from the dollars and cents standpoint and deal mainly with facts. Any additional support that we can offer from the standpoint of theory will be merely incidental.

On an irrigated farm, to raise but one kind of crop such as grain successfully is almost an impossibility, because in our short seasons it is not possible

to get the land all irrigated at the proper time. Diversified crops are therefore a necessity from this standpoint alone. If farming is to be carried on successfully on irrigated land it has been found that it must be done more intensively than under dry farming conditions, for with the added cost entailed by the labour of applying the water as well as the annual cost of the water itself, greater gross returns per acre must be obtained, otherwise it is not a paying venture. I propose before finishing to show how these added returns can be obtained by rotating the crops in an intelligent manner.

The principal reason for using legumes in a rotation, as has been so well explained in the previous paper, is to add plant food to the soil in the form of nitrogen. As in all arid and semi-arid districts our soil is comparatively rich in the mineral constituents required in plant food, owing to the fact that the limited rainfall during past ages has not leached them out as is continually being done in humid districts. On the other hand we have relatively less decomposed vegetable matter, the main source of nitrogen in the soil, owing to the more limited growth of vegetation in the past.

Of all the legumes now grown in temperate climates there is none that has a more markedly beneficial effect on the soil than has alfalfa. It is not used as generally in the East as are the common clovers, for the reason that it does not thrive as well in the East as it does in the western half of the continent. I shall not take the time to enumerate the reasons why this is the case, but will merely say that alfalfa is a "sunshine plant." With plenty of bright sunshine and a reasonable amount of heat and moisture it grows as we can get no other similar plant to grow.

Fortunately it is peculiarly adapted to irrigation. Drought in any particular time during the season does not affect it beyond the fact that it makes no growth at that particular time. Timothy illustrates well the point I want to make. As you well know, if timothy sod is dry in May and early June it will give an extremely light crop no matter how wet it may be kept during the rest of the season. With alfalfa on the other hand, while no growth may be made while it is dry, the moment moisture is applied, it starts to grow at once and grows just as vigorously as if it had never dried out. It yields heavier here than do the clovers. It is deeper rooted, not only drawing its nourishment from deeper down but opens up the subsoil by boring down with its roots so that the subsoil is in a much better mechanical condition for other crops when the alfalfa is ploughed up.

On the Lethbridge Experimental station a ten year rotation was established in 1911. Ten fields of one acre each were carefully measured off. If one established a similar rotation on a quarter section each field would of course be 16 acres instead of one, but the results obtained should be the same.

The arrangement of crops is as follows: Six fields are in alfalfa; each year one field of alfalfa is ploughed up and one field is seeded down. On the alfalfa sod a hoed crop is planted; we have used potatoes, but sugar beets, corn, turnips or mangels, or in fact any hoed crop the farmer might desire could be

used. After the hoed crop, wheat is sown. The wheat is followed with oats, the oats with barley, and after the barley the field is seeded down again.

The table given on the chart presents a summary of the more important results obtained since the rotation has been established. The figures represent the average yield for the past four years, i.e., 1912 to 1915 inclusive, and are therefore much more reliable than would be the case if only one or two seasons' results were used.

TABLE

Crop in Land the Year Previous.	Crop	Yield of Grain & Potatoes per acre Bus.	Yield of Hay per acre Tons.	Total Cost per acre $	Total Value per acre $	Profit or Loss per acre $
Barley	Alfalfa Seeding		.8	10.69	9.40	1.29
Alfalfa Seeding	Alfalfa Hay		4.2	12.70	50.10	37.40
Alfalfa Hay	Alfalfa Hay		5.1	13.12	61.07	47.95
Alfalfa Hay	Alfalfa Hay		5.1	13.24	61.57	48.33
Alfalfa Hay	Alfalfa Hay		5.0	13.27	60.14	46.87
Alfalfa Hay	Alfalfa Hay		5.4	13.47	65.12	51.65
Alfalfa Hay	Potatoes	607.0		70.77	300.96	230.19
Potatoes	Wheat	54.5		13.52	43.30	29.78
Wheat	Oats	83.0		13.49	30.83	17.34
Oats	Barley	43.7		12.29	22.83	10.54

It will be noticed that 6-10ths of the total area is in alfalfa. There are two reasons why such a large area is seeded down. One is that we consider alfalfa the most profitable crop to raise and the other is that alfalfa does not lend itself well to a short rotation because it takes at least two years before it establishes itself in a manner to give maximum yields, and, owing to the cost of seed, it is more economical to allow it to stand a reasonable length of time after it is once started. The return values used in arriving at the figures given are:

Potatoes ..... 50c per bushel
Wheat ..... 80c per bushel
Oats ..... 34c per bushel
Barley ..... 48c per bushel

As will be noticed, barley has given the lowest yield and oats the next lowest. This is what could be expected when one considers that the figures given are an average of the first four years that the rotation has been established. Alfalfa has never grown on the fields in which barley was planted till 1915. Oats have only been planted two seasons in fields on which alfalfa has been grown. However, taking them even as they are, the yields are good and without question, especially in the case of barley, the returns from now on will be greater. The exceptionally high yields of potatoes deserve special no-

tice. They have, of course, been planted on alfalfa sod each season, and there is perhaps no better preparation that can be given a crop of potatoes than ploughing up a field of alfalfa.

In this rotation the land is manured once in ten years. It is applied on the alfalfa sod the last year it is in hay, being put on in the fall. This perhaps accounts for the increased yield of hay which you will notice amounts to from .3 to .4 of a ton. By applying manure at the rate of 12 tons per acre on but one field each year a farmer is only treating one-tenth of his farm, which should not be too much if any reasonable amount of feeding is done.

If an irrigation farmer has over half his land in alfalfa each year, the natural question is how shall he market it? The real solution of this problem, for various reasons, is to feed it on the farm. Dairying is the most profitable way of feeding it, but experiments carried on at the Lethbridge station for the past few winters have demonstrated that it can be most advantageously disposed of by winter feeding of cattle and sheep.

TABLE

With alfalfa hay at $12.00 per ton the following profits were made:

Winter	Average Profit Per Head Cattle	Sheep
1911-12	$	$1.35
1912-13	10.37	.56
1913-14	9.14	1.38
1914-15	2.37	1.30
Total Average	7.29	1.15

The table shown on the chart gives the average profit per head made in the feeding operation with both cattle and sheep when alfalfa hay is charged at $12.00 per ton and grain (barley and oats) at 1 cent per pound. The object of these tests is to determine first, whether alfalfa can be fed profitably, and secondly, just the best combinations of other feeds to make to get the best results. There will not be time to deal with the second problem. The chart was prepared with the object of showing just what the results of our experiments have been in attempting to market alfalfa in the form of beef and mutton. Complete details regarding these experiments have been published and can be obtained by applying to the Lethbridge Experimental station.

In these experiments the feed has been charged at the prices mentioned, but no charge has been made for labour. The price of the hay is put high enough so that a farmer can afford to feed it. If he were selling it he would have to bale and deliver on cars, the cost of which we consider about offsets the trouble of feeding it. When fed, the manure is left on the farm, which in the long run cannot well be ignored.

I think I have made myself clear in regard to the profit shown, this is what is left after all feed is charged for. In other words, if a farmer just broke even he would still sell his hay at $12.00 per ton. The total average profit per

head of $7.29 for the steers and $1.15 on the sheep is his leeway and to protect him on any chances he has to take on an unfavourable market and interest on the money he has invested in the stock for the three or four months he has them in his possession. There are a number of interesting points in connection with winter feeding which time will not permit me taking up, but if there are any questions I shall be glad to answer them as well as I can during the discussion that is to follow.

In conclusion I may say that in my opinion our irrigated farms will not reach their maximum production till each farmer adopts a practical rotation and follows it up consistently. In it alfalfa should play a very important part not only because it is a profitable crop in itself, but because the mere growing of it will build up the productivity of his soil to a very high point. So far in this country we are putting in alfalfa for the crop itself, but I venture to say that there is a distinct surprise in store for the farmer himself and for the general public when they see the almost magical way alfalfa has of increasing the yields of ordinary field crops when it is ploughed up. (Applause)

CHAIRMAN: We will now call on Mr. Don H. Bark, formerly in charge of United States Irrigation Investigations in Idaho, who is to continue this discussion by speaking on "The Growing of Alfalfa."

ALFALFA GROWING

MR. BARK: Alfalfa has now been grown successfully throughout Alberta for a sufficient number of years so that it may be said to have passed the experimental stage. There is no doubt but that it now occupies a permanent place among the staple forage crops of the province. This plant is easily the King of forage plants, for no other forage contains so many essentials of merit. It not only excels all other forage plants both in yield and in feeding value, but also in its beneficial effect on the soil. Alfalfa produces more food value for less cost than any other crop we can raise. Indeed, too much can hardly be said in praise of this wonderful plant, and if history repeats itself, the time is not far distant when it will become the predominating crop on every irrigated farm in the province. As one of the great benefits secured from alfalfa is its great improvement in the fertility of the soil, it seems well in discussing the subject to deal for a moment with the fundamental principles of soil fertility, in order to show more clearly the beneficial influence of alfalfa upon our arid soils.

PRINCIPLES OF SOIL FERTILITY.

Of the many elements found in the soil, four only are used to any considerable extent by the plants. These four are nitrogen, potash, phosphoric acid and lime. Nitrogen itself is a gas and forms a large part of the air we breathe, but plants cannot utilize it in this form. It must be combined with other elements in the form of a salt (nitrate) before it becomes available as a plant food. The last three mentioned plant foods are minerals formed by the

breaking up and decomposition of the parent rock, of which the soil was originally formed. These four substances are the principal or most important of the plant foods. Crops not only need far more of them than all the rest, but good yields cannot be produced upon any soil in which one or more of these elements are either deficient or entirely lacking. The plants obtain these substances from the soil in solution in the water absorbed by the plant roots. Only such of these elements or compounds therefore as are soluble in water are for the time being available as plant foods, for the plants can neither absorb solid particles of plant food into their roots nor could they utilize them in this shape if they could.

All soil is primarily decomposed rock, the particles of which it is composed varying in size and fineness from the coarsest of gravel to particles so small that sometimes forty thousand would have to be laid side by side to make an inch. Soils as we commonly know them, however, are more or less mixed with vegetable matter in various stages of decomposition. This decomposed vegetable matter is commonly called humus, and is the principal source of that most important plant food, nitrogen, the mineral plant foods being derived from the parent rock. Now let us stop for a moment to note the difference between the soils of a humid country and of an arid or semi-arid one. The rains of centuries in the humid belt have caused a luxuriant vegetation to grow, which dying down each year, has added a world of humus and nitrogen to these soils, but these same rains have meanwhile leached out enormous amounts of soluble mineral plant foods. The soils of humid countries are therefore rich in humus and nitrogen, but comparatively poor in the mineral plant foods, while the soils of arid and semi-arid countries are almost diametrically opposite, for it has never rained sufficiently to either grow the luxuriant vegetation or to leach out the mineral plant foods. The soils of the arid and semi-arid regions are therefore rich in mineral plant foods, for they still have all that was originally contained in the parent rock, but they are quite liable to be deficient in nitrogen. It can be seen therefore that whenever the eastern or humid soil becomes worn out or run down, the addition of mineral plant foods is necessary. This can only be accomplished by the purchase and application of expensive commercial fertilizers. Arid and semi-arid soils, however, rarely need the addition of such fertilizers, for they have more mineral plant foods than the humid soils had a million years ago, but their supply of nitrogen and humus is normally only sufficient to last for but a few crops, when it must needs be replenished. And we are indeed fortunate that this can be so easily and cheaply done through the growing of that valuable plant alfalfa.

If we take pains to keep up the supply of nitrogen in our soil, we are far better off on an irrigated farm in Alberta than any one can ever possibly be on a farm in the humid belt, for with our soil far richer in the necessary plant foods, with our longer days of sunshine, and our ability to control the supply of moisture to the crops, giving them just what they need, and above all, when they need it, we can always grow larger crops and secure larger profits than can be secured anywhere in the humid belt, for the farmers in this belt have

neither the rich soil, the same amount of sunshine, nor the ability to control the amount of moisture in the soil, which is so necessary to maximum crop production. We must, however, grow alfalfa, for as I shall explain later on, it adds more nitrogen to the soil than any other crop we can grow.

Alfalfa, a Revenue Producer and Soil Enricher.

TYPE OF SOIL REQUIRED.

Alfalfa has been known to grow and do well on a very large variety of soils. It, however, has its preference, and usually does better on the lighter soils consisting of the sandy, sandy loam and clay loam. Even in districts having the heavier soils most farms contain one or more classes of soil, and in such cases the alfalfa should be planted on the lighter or more sandy soil. I should not hesitate, however, in planting alfalfa even though my farm consisted of all heavy soil. The one thing that alfalfa will not stand is wet, soggy soil. Though it requires considerable precipitation or irrigation water throughout the season, it prefers a well drained soil. If those desirous of planting alfalfa upon heavy soils will select the higher and better drained portions of their farm for this crop, but little difficulty will usually be experienced. Never plant alfalfa in the bottom of a depression that does not have surface drainage.

PREPARATION OF GROUND FOR IRRIGATION.

There are two types of irrigation systems adapted to alfalfa in this province, namely,—free flooding and flooding between borders, though the furrow or corrugation system might be used to some advantage in certain districts. Free flooding consists of flooding water between more or less parallel head ditches, spaced from fifty to two hundred feet apart. With this system, as

with all others, if efficient irrigation is desired, all knolls and depressions must be removed, so that water can run uninterruptedly without pooling up from one head ditch to the next one below it. The larger knolls and depressions should be smoothed off with a Fresno scraper, as this tool, where the haul is short, will move quicker and cheaper than any other implement in common use. After the larger knolls and depressions have been smoothed off with a scraper, a rectangular leveller, with which you all should be familiar, should be run over the ground, both lengthwise and crosswise of the field.

The head ditches with free flooding should be run on a uniform of grade of from one-tenth to three-tenths of a foot fall per hundred feet. They should be installed more or less parallel to one another, the proper distance between them depending somewhat upon the topography and nature of the soil. From fifty to two hundred feet apart has been found to be the proper spacing for this section. One ditch should be used at a time for the irrigation, the water being dammed up at frequent intervals by canvas dams, and turned out into the field through notches cut with the shovel in the lower ditch bank by the irrigator. If the levelling has been carefully done, and the irrigator gives the water careful attention, very efficient irrigation can be accomplished by this system. There should not be much waste water, but whatever water that is wasted should be caught up in the next ditch below and used for the irrigation of the next strip.

The use of a Canvas Dam.

FLOODING BETWEEN BORDERS.

This system is probably best adapted for alfalfa on practically all of the various types of soil found in the province.

So far as topography is concerned, it can be used on all but the steeper grades, approximately one hundred feet per mile being the maximum slope with which it should be used for alfalfa. The head ditches with this system are constructed in about the same manner and about the same or a little greater distance apart as with the free flooding system. The only essential difference between this system and the free flooding system is that more or less parallel border guiding dykes are constructed 30 to 60 feet apart between the head ditches, and more or less at right angles to them. The water is checked up in the ditch with canvas dams as before, and is flooded between the border guiding dykes to the next head ditch below, the dykes guiding and controlling the water in a much more efficient manner than with the free flooding, where the water is unconfined, and requires careful attention from the irrigator. To be ideally laid out for irrigation by this system the side fall should be taken out of each strip—in other words it should be made approximately level crosswise throughout its length. It is not necessary, however, to make the lengthwise slope uniform, it simply being necessary, the same as with the free flooding system, to smooth off the knolls and depressions sufficiently so that water may run uninterruptedly from one head ditch to the next one below. In actual practice where the land is not too steep these parallel border guiding dykes usually run down the greatest slope, for this is the direction the water will naturally run with the least attention. There will also be less side fall in each strip than as if the border dykes angled down the slope. The dykes are usually constructed at the time the levelling is done, the dirt being deposited on the location of the dykes by the Fresno. Where but little Fresno work is necessary the dykes are made by ploughing a back furrow consisting of two or four furrows on the proposed location of each dyke. The dykes are afterwards gone over by a ridger, which is run lengthwise of the back furrow. This ridger consists essentially of two 2x12 planks, 16 to 18 feet long, placed on edge with a spread in front of from 12 to 14 feet and only approximately 3 feet behind. The wide end is pulled ahead, thus gathering a shallow layer of dirt from quite a wide area on each side of the back furrow, the dirt being pulled against the side of the back furrow by the sloping sides of the ridger. These ridges are afterwards smoothed down and rounded over by harrowing them lightly, the alfalfa being planted across the top of the ridges in the same way and at the same rate as between. If these ridges are constructed in this manner they will be high enough to control the water, yet broad and low enough so that alfalfa will grow on the tops of them, and the wagons and hay tools can cross them with no inconvenience whatever. The ridges when completed should be from 6 to 9 inches high in the centre and from 2 to 3 feet broad at the base.

In practice the water is turned into the head of each strip at two or more places and spreads quite uniformly between the two guiding dykes, as it advances across the strip. The irrigator should cut it off and turn it into the next strip below as soon as the water has advanced far enough so that the quantity in the strip will advance to the lower end and thoroughly irrigate the bottom portion.

This system is a very efficient one, for not only alfalfa but all other grasses, and provided the ground is properly prepared for it at the start, it will be found that the water will actually require less attention and that more acres can be irrigated in a day with less water and less work than by means of any other system.

PREPARATION OF SEED BED.

The preparation of a proper seed bed for alfalfa is very important. Alfalfa has a small seed, and the plant for the first two or three months is rather weak and puny. It therefore requires a well cultivated seed bed, for a good stand cannot be secured if it is planted in rough, cloddy ground. Alfalfa plants are quite spindling and grow so slowly during the first two or three months of their growth that the weeds in a very weedy field will sometimes either entirely crowd out the alfalfa or be the means of securing a very thin stand. It is best therefore to plant alfalfa on a tract of land that is as free from weeds as possible. Land that has been summer-fallowed the previous year, or that has produced potatoes or other rowed crops is best adopted for alfalfa, as it will be the freest from weeds. Grain land that is fairly free from weeds is also well adapted for alfalfa provided it has been in cultivation long enough to disintegrate the sod. Do not plant alfalfa on new breaking, as the prairie and other grasses will not let the alfalfa secure a good quick start.

INOCULATION.

As was mentioned in the introduction, alfalfa has the power of supplying nitrogen to the soil, and it is a good thing Providence provided this plant with this power, for if it did not have it there would be but few soils sufficiently rich in nitrogen to grow the crop for any length of time. This same thing would probably hold true to a somewhat lesser extent with the other leguminous crops, for they all contain a large amount of nitrogen or protein. They therefore must be able to secure a large amount of it from the soil. The manner in which alfalfa and the other legumes supply nitrogen to the soil is through the bacteria which live in and upon their roots. These bacteria are not originally present in all soils, for these particular bacteria cannot live without legumes, nor can the legumes live for any length of time without the bacteria, the principal reason being that the legume is such a greedy feeder upon the nitrogen in the soil that unless the bacteria are present, it soon exhausts the available nitrogen in almost any soil. While all legumes harbour bacteria of much the same nature, it has been found that there are certain kinds that prefer each particular leguminous plant. This is probably due to the fact that these particular bacteria have adapted themselves to this plant. These bacteria are so small that they can scarcely be seen with even a microscope of the highest power. It is believed that they are absorbed by the minute root hairs along with the water, and after being absorbed irritate the roots to such an extent that plant juices are automatically thrown out at the spot, thus forming the

little appendages called nodules in which the bacteria live. These nodules vary with alfalfa from small whitish lobes the size of a pin head to clustres of these lobes one half inch in diameter arranged somewhat like a bunch of grapes. These bacteria after becoming domiciled in the nodules attached to the roots multiply at an extremely rapid rate, and are able to absorb the free nitrogen found in the air spaces of the soil, and work it over into nitrates, a definite chemical compound and a plant food of the highest value, in which shape the alfalfa itself or any other plant can utilize it. These bacteria therefore are very essential to alfalfa, no matter where it is grown. In the soils of certain districts throughout the West it seems there are enough of these alfalfa bacteria or other bacteria of a similar nature that can readily adapt themselves to the alfalfa plant, so that it is unnecessary to inoculate the alfalfa at the time of planting. Such is not the case here, however, though the continued planting of alfalfa on our irrigation projects may in time develop these bacteria so that they will become so widely scattered throughout the soil that it will be found unnecessary to supply them artificially.

The best method found to date of supplying these bacteria to our alfalfa fields is to secure surface soil to a depth of nine or twelve inches from an old, well-established alfalfa field that has become well inoculated, and to scatter this soil evenly at the rate of from 200 to 400 pounds per acre upon the field after it has been prepared for alfalfa, and immediately before seeding. Failure to do this and take the proper precautions after it has been done has probably been the cause of a greater number of failures with alfalfa in this part of Alberta than all other causes taken together. These bacteria can stand very low temperatures, even 20 or 30 degrees below zero will not kill them, but either bright sunlight for a few moments or a continued temperature for a few hours of 100 or more degrees Fahrenheit will kill them very readily. It is therefore very necessary to secure the original soil in a fresh condition, to keep it in a comparatively cool place free from sunlight and to spread it promptly and evenly upon the field to be planted, after which it should be immediately harrowed in so as to cover the bacteria deep enough and quick enough so that they cannot be killed by sunlight. If these precautions are taken, but little trouble will be experienced with the soil transfer method of inoculation.

There is one other method of inoculation that is coming into quite general use. This is inoculation by pure cultures, which are purchased from laboratories which make a business of growing and preparing these cultures for this use. These cultures cost from one to five dollars per acre, are put up by the laboratories, and delivered to the consumer in small bottles, each bottle containing millions of the proper kind of bacteria. The directions for using these cultures differ slightly, but should be strictly followed. They usually state that the contents of the bottle should be emptied into a gallon of water that has previously been boiled and cooled, to which is added a little sugar or beef broth, after which the mixture is placed for forty-eight hours in a moderately warm place to enable the bacteria to grow and multiply, about the same as a house-wife sets her yeast. After these bacteria have been devel-

oped a little more water is added, after which the alfalfa seed itself is thoroughly sprinkled with the solution containing the bacteria. The seeds are then allowed to dry in a moderately cool, dark place, after which they should be immediately planted. If the culture is good when secured and directions are followed out, a sufficient number of bacteria are usually attached to the alfalfa seed to thoroughly inoculate the whole field. After the small plants start to grow the bacteria are absorbed by the roots, and the process previously described is carried out, the bacteria not only furnishing sufficient nitrogen in an available form for the growth of the plant, but an excess supply for the crops which will follow, after the alfalfa is ploughed up.

The soil transfer method of inoculation where soil free from weeds can be secured is, however, probably the cheapest, surest and best method for the farmers of this section, and if directions are carefully carried out there will be but few failures. The principal precautions that are necessary are (1) to procure fresh soil from a field that you are sure is well inoculated, (2) to apply it immediately, and (3) harrow it in without delay.

When alfalfa is well inoculated it will be noticed that the plants are vigorous and of a dark green colour, while the plants not inoculated are liable to be spindling and of a light or yellowish green colour. The lack of inoculation, however, should be determined by a careful examination of the roots for nodules, as too much soil moisture also causes alfalfa to be light or yellowish green in colour. The inoculation frequently takes well only on a portion of the field. If these spots are well scattered over the field they will probably spread over the entire area during the second year. If they show up only on part of the field it would be well the second spring to put more inoculated soil on that portion about the time the plant starts to grow, and to disc it in lightly at once. Irrigation water spreads the inoculation much better than rainfall, as some of the bacteria seem to be carried in suspension in the water. Some have inoculated their fields by spreading a strip of inoculated dirt below the ditch and irrigating immediately the water carrying sufficient bacteria from this dirt to inoculate the field. This method is not recommended, however, except during the second year, and then only in cases where the inoculation hasn't become well established from the original inoculation.

TIME OF PLANTING.

A study of the rainfall records of this section shows that there is usually sufficient rain during May and June to start alfalfa, and these are the best months to start it, not only because of the rainfall, but as the plants are not particularly hardy until they attain a height of at least six inches, it is desirable to secure as much growth as possible before winter sets in. It is considered of considerable advantage to have rainfall enough to start the alfalfa, for the seeds are so small that if one were compelled to irrigate freshly harrowed soil to start the seeds, some of them would be bound to be washed away. This section is especially fortunate in this regard, for in most alfalfa growing districts it is necessary to irrigate the seed up.

VARIETY OF SEED.

Though there are between 50 and 100 species of alfalfa, not over six of these are of much economic importance and these are all much alike. The chief difference between the American varieties is in hardiness or ability to resist cold winters, the two best strains for this locality probably being Grimm and Turkestan. Both of these strains have done very well here and should be recommended for planting, though almost any Northern grown Montana seed should give good results.

RATE OF SEEDING.

Alfalfa seeds are quite small but usually have very good vitality. It has been found by actual count that if ten pounds of seed are scattered uniformly over an acre, fifty-two seeds would be placed upon each and every square foot. As it is indeed a poor farmer who cannot make at least half the seeds planted grow, it can be seen that planting at the rate of twenty pounds per acre is unnecessary, for this would put one hundred and four seeds upon every square foot or nearly one to each square inch. From carefully conducted experiments on a Government Experiment station in southern Idaho, where all conditions were ideal, including a very fine seed bed, it was found there was no difference in the yield during a three year period from alfalfa seeded at the rate of 4, 8, 12 16 and 20 pounds per acre. It is not possible nor practicable, however, for the farmer to manufacture such a good seed bed upon large areas, as was secured on this Government Experiment station, and it is therefore recommended that from 12 to 20 pounds and no more of good alfalfa seed be planted. Do not make the mistake of planting too deep. Alfalfa seed is small and cannot, like peas, wheat or potatoes come up through three or four inches of soil. During fairly moist weather one half inch in depth is sufficient, while in drier weather from one to one and a half inches would be somewhat better. Do not plant alfalfa deeper than one and one half inches. It does not matter much whether alfalfa be planted in drills or whether it be sown broadcast, so long as the proper distribution and depth of planting is secured. In planting it broadcast on top of well prepared ground, a fairly light harrowing after seeding usually places most of the seeds at about the right depth. Drilling the seed is probably preferable in this section, for if careful attention is given to the drill all of the seeds may be placed at the proper depth.

NURSE CROP.

There is no question but that a better stand of hardier alfalfa will be secured if it is planted alone, without a nurse crop. Alfalfa prefers lots of sun, which cannot be secured when it is planted with oats, wheat or barley. There is no possible advantage in planting a nurse crop with alfalfa, except that a year's use of the ground is not lost. Taking the extra hardiness of the plant and the thicker stand that is secured without a nurse crop into consideration, however, it is hardly probable that it will pay in the long run to plant alfalfa with a nurse crop.

If alfalfa is intended as hay for either hogs or cattle or a pasture for hogs, it is preferable to plant it alone. It is, however, much improved as a horse hay, both in yield and feeding value if some other grass is planted with it. A grass to form the best mixture with alfalfa should do well in the shade, mature at about the same time as the alfalfa, and be comparatively rich in carbo-hydrates, instead of protein, in order to form a more nearly balanced ration. The very best grass that can be planted with alfalfa to accomplish this purpose is orchard grass. It is perfectly hardy in this climate, it does well in the shade, matures more nearly at the same time as the alfalfa than any other grass, is relished by stock, and has a good feeding value. Liverymen that have once fed this type of hay to their horses will pay from $1 to $2 per ton more for it than straight alfalfa. Where orchard grass will grow and do as well as it does here, never plant timothy as a mixture with alfalfa.

IRRIGATION OF ALFALFA.

The irrigation of alfalfa or any other plant is easy and simple, providing the land is sufficiently and properly prepared at the outset. Too much emphasis can hardly be placed upon the preparation of the land for the irrigation of alfalfa. Water cannot be made to run up hill, and it is absolutely imperative if good success is to be obtained with alfalfa that all knolls and hollows be so levelled down at the outset before the alfalfa is planted that the water can be made to run uninterruptedly from one head ditch to the next one below it. There is much more reason for careful levelling of the ground before planting alfalfa, pasture or other permanent crops, than there is with grain, for the same trouble will be experienced with every little hill and hollow every time the alfalfa is irrigated every year, while where grain is planted there is an additional opportunity of doing more levelling on the land each spring.

Levelling Land with a Fresno Scraper.

WHEN TO IRRIGATE ALFALFA.

Careful experiments have been made during the past few years to determine at what stage of growth alfalfa needs irrigation, and it has been found that it needs a practically constant uniform supply of moisture throughout the season.

This condition can only be brought about where irrigation is possible, yet owing to the variation in the precipitation in this section, no hard and fast rule can be laid down, either as to the number of irrigations required or the stage of growth at which they should be applied. Much will depend upon the type of soil and the amount of rainfall received during the season. Every irrigator should learn to study the needs of his own particular soil and crops, and then apply his irrigation water at such times and in such amounts as will maintain the necessary constant uniform moisture supply in the soil. Alfalfa should never be allowed to become too dry, and above all, water should never be allowed to stand on it during irrigation for over twelve hours at a time. Neither should it go into winter quarters in a very wet, muddy condition, as winter killing may result. During normal years in this section alfalfa will probably require from two to three irrigations during the season.

AMOUNT OF WATER REQUIRED.

Alfalfa is a gross feeder, and grows luxuriantly throughout the season, there being a very large amount of leaf surface exposed to the sun and wind, from which an unusual amount of transpiration takes place. Alfalfa therefore requires considerably more water than almost any other crop we can produce, all other conditions being uniform. A long series of careful, exhaustive experiments were conducted under my supervision by the United States Government for this purpose, and demonstrated that where all other conditions are similar, alfalfa requires twice as much irrigation water during a season as grain. Where grain does best with one acre foot per acre, alfalfa requires two acre feet, and where grain requires one and one half acre feet, alfalfa requires three feet, and has a tendency to produce the most crop where the most water is supplied, though care must be used not to over-saturate or waterlog the soil, for alfalfa will not stand "wet feet".

TIME TO CUT.

Alfalfa is pre-eminently adapted as a hay crop, for no other forage recuperates so quickly after cutting. Parts of southern Arizona and the Imperial Valley, California, cut alfalfa as often as nine times a year. In order to secure the largest possible crop of the highest possible feeding value, however, alfalfa must be cut at the proper stage. This is at the time that the little basal shoots or the sprouts of the next crop start, which is usually when the crop is about one-tenth in bloom. If the crop is left until one-half or in full bloom these basal shoots will have grown so long that the mower will clip their tops, thus retarding the start of the second crop, while if it is cut at the proper time just

as these basal shoots start up around the crowns near the ground the next crop will come on and begin growth immediately, provided the necessary amount of moisture is available in the soil at the time.

GENERAL TREATMENT, FIRST AND SUCCEEDING YEARS.

There is insufficient time and space at my disposal to make a general discussion of alfalfa in all its phases. These other phases will be taken up by other papers. I wish, however, to dwell slightly on the general treatment of alfalfa. After planting alfalfa there is nothing to be done with it until it is from six to ten inches high, except to see that it has the proper supply of moisture. At from six to ten inches in height, no matter whether the field is weedy or not, it should be clipped in order to strengthen the crowns and thicken up the growth. If the season has been favourable enough and the initial planting early enough there may yet be time to secure one crop during that season, though in the majority of cases even in much milder climates no crop at all is expected the first year. Mr. H. Lausen of Carseland during the past season has secured about as large a yield from alfalfa for the first season as I have ever seen, even in the mild climates of Colorado, Utah or Idaho. Mr. Lausen planted two acres during the latter part of May, 1915, and in August harvested one and one-third tons of cured hay per acre from the plot. This I consider to be phenomenal. If the initial planting of alfalfa has been done so late in the season that clipping when it has reached from six to ten inches in height will force it to go into winter quarters with less than four inches of growth. I would not clip it the first year at all, for alfalfa, in order to be able to withstand the winter in the best possible shape, should have some amount of growth at the time the ground freezes up. This holds particularly true for the first season. In the subsequent years alfalfa requires no unusual treatment, except that care must be used that it has a proper supply of moisture, that water does not stand upon it, and that the crops are cut and cured properly. Discing and loosening up of the surface each spring, after about the third year has been found to be beneficial in many localities, particularly if weeds or grass have a tendency to creep in. Under these conditions discing every spring will be advised here.

HARDINESS AND VITALITY OF ALFALFA.

There is no doubt in regard to the hardiness and long life of the alfalfa plant in this section. If planted on the proper class of well-drained soil it will positively do as well here as in any similar climate on earth. It has been my pleasure during the past season to find alfalfa stems seven feet nine inches in length, and to dig five roots of alfalfa that totalled seven feet across the crowns when hung up side by side. Neither southern California nor Asia herself, the original home of alfalfa, can beat this, so have no fear in regard to the strength and hardiness of alfalfa as grown in this part of Alberta.

Illustrating the Hardiness and Vitality of Alfalfa.

CONCLUSION: Before closing I wish to again emphasize the following facts:

1. That alfalfa growing is no experiment in this part of Alberta.

2. That alfalfa has a greater food value and produces more of it at less cost than any other forage that can be raised in this section.

3. That there is no other crop that will improve one's soil so much as the growing of alfalfa. It has been known to double and even treble the yield of cereals after having been grown for but three years.

4. That the lighter soils are best adapted to alfalfa and that only well-drained soils should be selected for this crop.

5. That ground planted to alfalfa should be carefully prepared for irrigation—that money spent on levelling pays larger returns on the investment than the expenditure of any other like amount.

. That alfalfa seeds are so small that the manufacture of a finely pulverized seed bed is absolutely imperative if good results are to be secured.

7. That alfalfa ground must be inoculated in this section; that soil transfer is probably the preferable method; and that great pains must be used in securing fresh soil, in spreading it evenly, and in harrowing it in immediately if good results are to be secured.

8. That from 12 to 15 pounds of seed per acre planted not over 1½ inches in depth is proper.

9. That planting without a nurse crop will give better success nine times out of ten and be more profitable than planting with a nurse crop.

10. That alfalfa requires more water than grain, and that the soil should have a uniform moisture content from early spring until late fall.

11. That alfalfa should be clipped the first year about the time it reaches 6 to 10 inches in height.

12. That the crops should be cut whenever the basal shoots or the beginning of the next crop's growth starts, which is when approximately one-tenth of the crop is in bloom.

13. That alfalfa should be disced every spring after the second year, particularly if weeds and grass have begun to grow with the crop. This not only kills the weeds and grass, but actually causes the alfalfa to become thicker on the ground.

14. That alfalfa has a broader use, and is more profitable and more certain than any other crop that can be raised in this district, and that when alfalfa is once planted on a farm and given a fair trial not only as a horse feed, a cattle feed and a pig pasture, but as a soil rejuvenator, that this farmer will never again be willing to farm without an alfalfa field on any irrigation project in Sunny Southern Alberta.

(Applause).

CHAIRMAN: Mr. Hinkle, who was to have come, I regret now to say, is unable to be with us.

I believe arrangements are being made by the good citizens of this town to give a banquet to the delegates to-morrow night, and they want a show of hands to find out how many of the duly accredited delegates will be here to-morrow night, so as to make arrangements accordingly. Now, if those who are delegates in the room and can accept the kind hospitality of the town, I will count them and report.

(Approximately fifty delegates showed their intention of accepting the invitation).

We will now hear from Mr. G. R. Marnoch, President, Lethbridge Board of Trade.

MR. MARNOCH: So that I may not appear before you clothed in false pretences, let me warn you at once that I must disclaim the honour of being as I am described in some of the press notices of this Convention, "a prominent agriculturist". I am only a plain business man, but as such, the established and projected irrigation projects in the Lethbridge district have always been appealingly interesting to me.

The oldest irrigation project of any size in the prairie provinces comes right close up to the gates of the city of Lethbridge; and, for some years, the citizens of Lethbridge drank the water that was brought into the city by irrigation canals.

We have become so used to seeing successful farming carried on under irrigation, and the people of this province have become so accustomed to the fact that irrigation is successfully carried on in the districts around Lethbridge, that they have almost forgotten the existence of our irrigated farms, and the significance attaching to the fact that these operations are carried on.

The farmers surrounding us, however, have been very observant of these successes, and those who have no irrigation are exceedingly jealous of those who have the water.

The Irrigation Branch of the Department of the Interior has for some years past been carrying through preliminary surveys of the available waters, and of the lands to which these may sooner or later be carried. Farmers to the north of Lethbridge were told some little time ago that it was possible to divert water to 100,000 acres of their lands at the reasonable capital cost of somewhat less than $20.00, and they have displayed so keen an anxiety to get the water at the earliest possible moment that on the one hand the Dominion Government has been rapidly carrying out detailed surveys to show just how many acres of each quarter-section could be watered, and on the other hand the Provincial Government has provided the necessary legislation to enable these farmers to form themselves into an Irrigation District, and so to become established in a cohesive body that they may be able to issue bonds upon the security of their lands, and thus put themselves in shape to attend to the necessary financing.

Information has recently been made public by the Irrigation Branch to the effect that another project, covering approximately 350,000 acres of land east and south of Lethbridge, could also obtain irrigation water at reasonable cost, and as time goes on and as future details of the exact description of these areas are made available, we shall no doubt find the farmers who are so fortunate as to find themselves within these areas, also clamouring for water.

These projects to which I have referred have of course to travel some way before they reach completion. But there is another upon which action is now actually proceeding; that is an extension of the established district near Lethbridge, whereby some 15,000 acres lying east of Lethbridge towards the town of Taber will actually have irrigation water flowing over them sometime during 1916.

I have proceeded in a somewhat inverted order, and now come to our established irrigation areas. The water was first brought to these lands some twelve or fourteen years ago, and there are now some 75,000 acres occupied and farmed while there are still unoccupied and available for sale some 35,000 acres.

Although considerable progress has been made in the development of the 75,000 occupied acres, we are still a very long way off the point of having reached the highest productivity. There are some highly developed farms, and there are some that have not made great progress. There has been a tendency for farmers to acquire areas too large for the amount of capital that they had in hand for development—a common complaint in this Western Canada—but that is a condition that will be gradually rectified as time goes on.

There are some 13,000 acres under alfalfa, and the acreage under this crop is extending every year; the demand for our alfalfa hay for the mining and lumbering camps in British Columbia is constant, and some of our alfalfa and timothy has found a market as far east as Winnipeg. This summer has been one to cause the dry farmer to smile, and even to grin broadly at times;

and it has brought some worries to our irrigation farmer. The summer rains fell inopportunely for the harvesting of the alfalfa crops, with the result that there is not so much available for shipping out as there usually is, and considerable quantities of this crop will perforce have to be fed on the farms. The alfalfa retains its feeding value, but its colour and condition for shipping have been damaged. This, however, may ultimately prove to be a blessing in disguise; for it is undoubtedly discovering to the farmer and to his banker that the greatest advantages from irrigation operations lie in the development of the livestock industry.

Mr. Fairfield, and Mr. Dunham, our lawyer-farmer, will deal with this; so I will only anticipate that they will say by a little leaf of personal experience. I am going to refer for a moment to the value of fertilizers: I lived in Ceylon for a good many years, and I will tell you of what happened there with regard to a single crop without fertilization. The coffee industry attained large proportions in Ceylon; many planters made fortunes, and many retired and lived in the Old Country enjoying steady incomes of $10,000 a year off comparatively small acreages. In one single year the whole crop was blotted out by fungus and blight. The bushes had enough vitality to produce crop from year to year—but they had no reserve power, and the depleted soil could not supply it to enable them to resist disease.

Our planters, however, were not hopelessly discouraged; they set about planting the abandoned fields with tea bushes; but they were forewarned and forearmed by their sad experience in coffee, and so, whenever the tea bushes showed signs of lack of vigour they got scientists to tell them what the tea bush ate up, and they proceeded to supply what was lacking in the plant's daily food. The present position is that for every pound of dry tea shipped off a tea garden, one pound of highly expensive compound fertilizer is shipped in and dug into the soil around the bushes.

Here then is another illustration of that oft-told tale, that the soil cannot be robbed without disastrous results. And the moral for irrigationists is —and they have the means of doing it all right—to feed their crop to livestock, and apply the manure to the soil.

A farmer within the area of the proposed Lethbridge Northern project carefully summer-fallowed 26 acres in 1914; in the spring of 1915 it looked like his top mulch might blow away; he had a fair quantity of stable and cow manure, so he at once set to and spread that over his field. I am almost afraid to mention the result—you may hardly believe it even in this year of phenomenal yields—but here it is. His crop—and mind you both land and crop were carefully measured—amounted to 74 bushels of wheat to the acre. He is dead anxious to get irrigation, and when he gets it he will show you crops of alfalfa that will make even a ripe field of wheat look green again with envy.

I want to direct your attention now for a few minutes to these maps:

This map of the territory around Lethbridge shows the present status of the irrigation projects in different colours. Here to the south of Lethbridge are the old established Alberta Railway & Irrigation Company's lands. These parts

appropriately coloured in green show the producing areas. Here in yellow are the lands supplied with ditches and running water, but still waiting for farmers to cultivate them.

Up here to the north is the proposed Lethbridge Northern project, showing in red the outlines of the areas to which water can be diverted from the Old Man River west of Macleod. The total capital cost of this project will be nearly $2,000,000. As I have said, the farmers in these districts are very keen on getting the water.

On these other areas coloured in pink, to the northeast of Lethbridge, is situated the Southern Alberta Land Company's project.

Now please observe all these little squares with names marked across them: These indicate school districts, and school districts indicate population. Note the schools on the green producing areas. Note also the names on the red areas of the Lethbridge Northern project; the people there want the water. Note again the entire absence of schools in the pink area; this has still to be colonized.

In fact, as I often say, on the green land there are men, land and water. On the yellow area there are land and water, but no men. On the red area, land and men, but no water. On the pink area, land and ditches where there will soon be water—but no men.

Down here to the south and east of Lethbridge is the area enclosing the 350,000 acres which may be watered later on.

Now, gentlemen,—what does all this mean to Western Canada? For the answer to that question, please look at this other map, which shows the southern parts of Alberta, Saskatchewan and Manitoba. On this map, Mr. E. F. Drake, the Dominion Superintendent of Irrigation, has shown all the areas to which I have referred, and, in addition, he has shown the C. P. R. Eastern and Western projects: These contain lands to the extent of roughly 800,000 acres capable of irrigation.

Let us look now at the total areas comprised:

1.	The old established Lethbridge project with recent addition	125,000 acres
2.	The Southern Alberta Land Co.'s lands	250,000 acres
3.	The Lethbridge Northern project	100,000 acres
4.	The C. P. R., Eastern & Western Sections	800,000 acres
5.	The areas east of Lethbridge	350,000 acres
	Totalling say	1,625,000 acres

Of all this, what is being farmed at present is a mere flea-bite in proportion.

Look now across the map and consider how much of this southern territory of Alberta and Saskatchewan had actually to be supplied with seed grain for the 1915 crop, owing to the drought of 1914.

Have also in mind that all our Western farmers are turning their attention to livestock raising.

Have in mind also the hay crop—conditions in Saskatchewan and Manitoba this spring and summer. From Mr. Angus Mackay, whose authority will not be questioned, we had the information this year that the rains came too late for hay in these regions this spring, and that the position in regard to hay was somewhat insecure; and I may say that we have shipped quantities of hay and alfalfa as far east as Winnipeg this year.

With these points in mind, then, what does the development of these tracts under irrigation mean to Western Canada as a whole?

It means an assurance that under such circumstances as these, adjustments would take place so that the farmers' livestock would be taken care of in the matter of green feeds. This would come about by our shipping out hay, or by the dry farmers shipping in their livestock to feed here.

As I have mentioned, Mr. Dunham will deal further with these matters, and, as I have already taken up a good deal of your time, I will leave it in his hands to further extend the theme. (Applause).

MR. DOMAILE: I shall have to take issue with the last speaker in regard to the quantity of seed grain shipped into Saskatchewan last year. In a new province we have a large number of unskilled farmers, but they become skilled farmers. In all that dry area of Saskatchewan all the old farmers were getting good crops of grain. I know lots of places where men who have been there many years, even with the drought of last year, had 28 bushels of wheat and good wheat too. I may say this because some people here might be prejudiced against Saskatchewan on account of all the grain shipped in to us and the quality is a sore point with us, as well. All that part of Saskatchewan, that is the southern part, if farmed carefully, is capable of producing excellent crops, and I have been all over that country. There was a great cry that the settlers should be taken away and that they should never have gone into that district, but we found all over the country old farmers who had been farming for a number of years, and farming carefully, and they had very, very good crops indeed.

CHAIRMAN: The suggestion was made this morning that at the time of the closing of all addresses, we should take some time for discussion. If any person has anything to say in connection with any of these addresses, we should like to hear them.

MR. DENNIS: We have all listened with a great deal of pleasure to the able and full address relative to the necessity of alfalfa in our irrigated areas, and the results obtained therefrom. I am fairly in accord with and particularly anxious that everything possible should be done for the introduction of alfalfa, and we have endeavoured to assist the farmers in this, and have brought in alfalfa seed here. One point, however, is entirely overlooked. They have given us the beneficial results from feeding of alfalfa to live stock. Mr. Fair-

field made that clear, and Mr. Bark has dwelt very fully upon what is necessary to obtain results, but they have all overlooked the value of alfalfa as food for human beings. There is a place in Minneapolis where alfalfa products are now sold in shape for human beings, and I give this information in order that the discussion may be complete. At this store, as Mr. Cameron and some of our officials know, you can buy alfalfa bread and alfalfa cake and alfalfa tea and alfalfa coffee, and even alfalfa hair tonic, and alfalfa candy, and alfalfa laxative, and alfalfa products of all kinds, and numerous other things. I just want to add that to the discussion to show that while it is very good for sheep and cattle it is also good for human beings. I have tried the candy. It was very good, and the tea served was very good. In fact the ladies and gentlemen who did not know what it was expressed their opinion that it was very good tea. I have not tried the hair tonic yet. (Laughter) (Applause).

MR. SPEAKER: The general thing insisted upon all through these meetings has been increasing production, and the chief weight in regard to increasing production is laid on increasing live stock, and importance may be regarded as centred in that direction because I believe the foundation for farming in this country and all countries is in live stock, but the question on my mind of many farm leaders in the Western Province, which has been very urgent for some years and is growing continually, and which we shall be up against in a short time, is, what are we going to do with the live stock when we have raised it. I think that is more urgent than most farmers have realized.

In regard to the hog production we would have been absolutely up against it in the fall two years ago, if just at the critical time when we really saw no outlet for hogs and the price looked like going down to four cents, the American market had not been opened to us freely, and we got rid of our surplus there. Last year, or just about the time the war commenced, we were in the same position as to having an overplus in the way of live stock, for which we saw no clear market and we were up against it again to run a very great depreciation in prices. The war conditions came in and a great many hogs were destroyed and not sold at all.

Now, in regard to the cattle business, that is growing in urgency every week. The Assistant Commissioner of Live Stock for the Dominion in my office told me that, in Ontario if it had not been for some special French war contracts there would have been a complete slump in cattle there, as there was not an outlet for what they were producing. He told me in Alberta we were not far from it. He said he had thorough information but I was rather sceptical. I think that as farmers and also business men, the most difficult problem we have before us is, I am convinced, the organizing of our live stock in all directions. We have given our attention the last ten years chiefly to organizing the grain business, and have fairly succeeded in that, so that it is in fairly good shape for marketing, but we have done nothing at all for organizing a live stock business and that applies in all its direct and indirect applications.

For me it is the most marvellous fact and one absolutely discreditable to our business sense in Canada that in Great Britain, I think, for the eight months of this year, there were imported into Great Britain, in exact figures, about $87,000,000 worth of butter, and of that I do not think Canada had more than between $1,000 and $2,000. Now, there is not a country on the face of the world that is better situated, and very few so well situated, for the dairy business, and for the sale and export of butter, than Canada is. Yet we are actually nowhere in the great market yonder; but not only that, we are beaten in our own market by the importing of butter from New Zealand, so that in every direction of the live stock business, we are at the bottom end. It lies so much on my mind, and it will be so absolutely urgent in a very short time, that I want to appeal to all men here; to the men in the office; to the official man, and the man who controls the great railway corporations. We need the co-operation of the brain and help of these men to solve a problem which so far as the farmer is concerned, is the most difficult problem of all. I hope you will pardon me for introducing these remarks, but it is so absolutely necessary for us to face them that I did not want to leave without saying something on this subject.

MR. PETERSON: I have listened with great interest to the addresses of Mr. Fairfield, an old friend of mine, and Mr. Bark and Mr. Porter. As Mr. Speakman has pointed out, these gentlemen have dealt with the subject of production and have dealt with it in an optimistic way. The only note of pessimism introduced into the meeting came from Mr. Dunham and Mr. Speakman's addresses as to the market for our products. As to alfalfa, it seems a fairly simple matter, and Mr. Fairfield has shown us this morning with what outstanding success he has succeeded in feeding sheep and cattle. In the Irrigation Block here, my associates and myself organized a company and put in a very large bunch of sheep, and I hope the day is not far distant when sufficient alfalfa will be raised in our district to feed our stock during the winter.

To say that our markets are badly organized is, I think, only too true. Take the by-products of the live stock industry, for instance turkeys. I think in Victoria they were selling at 35 cents per pound cold storage. In Calgary I bought them at the public market home raised for 18 cents. There is a spread of over 100 per cent between the retail prices in Victoria and Calgary. It seems to me there is something radically wrong in handling farm produce in this country, when there is such a difference. Take mutton; how is it that you cannot buy a decent piece of mutton in this whole country from the Coast to Winnipeg. You go into the butcher shop and ask for mutton and you get cold storage mutton from New South Wales. Outside of a hind quarter of lamb, I have not been able to buy a decent piece of mutton in this country. It is perfectly dishonest that out at the Pacific Coast in Victoria, they will advertise Island mutton, and you will get a piece of mutton that grows anywhere outside of New Zealand. When you go in to buy cold storage mutton you know what you are buying. We have a law in Canada, I think, that deals with the

prevention of fraud in food stuffs. That is, you cannot fill a can labelled "Tomatoes" with sawdust, and say it is tomatoes. The law says you must fill it with tomatoes. Why cannot we insist by law if necessary that the butcher shall state whether it is cold storage mutton or home grown or New Zealand? Some years ago when they first placed New Zealand mutton upon the London market they insisted upon it being labelled "New Zealand mutton". When I was in London last a man told me that he invariably bought New Zealand mutton in preference to the home product, and I am referring to Canterbury mutton, which is produced on what is perhaps the best sheep growing plains in the world.

When we first started our company we had a thousand odd sheep for sale. There was no market and fancy this, in a country where you could not get decent mutton, the Swift Company and the Burns Company could not buy it because they were loaded up with New Zealand mutton. I think it is just as legitimate to insist upon the retailer informing his customer whether he is buying fresh mutton or frozen mutton as it is to insist the other food stuffs being properly branded as the law requires at the present time. I am merely suggesting that in the rudiments of market organization there is one thing we can insist upon being done. I have no objection to frozen mutton being sold in this country. The whole of the western population has been educated to eat frozen mutton. A great many of them who have lived in this country for a great many years do not know the difference, but I think one difficulty in the market as far as mutton is concerned is the selling of it without stating where it comes from, and by selling these things under different and distinctive names the public would soon notice the difference.

MR. LAWRENCE: It is over fifty years ago that I attended the first agricultural meeting, and I have been to some scores since, and invariably this market question crops up in one way or another. As the last speaker says, he had a thousand sheep to sell and he found that the cold storage people had already provided for the season. The consequence is that he could not make any market for his mutton. Now, would it not be common sense in a case like that to tell Pat Burns or Swifts, or whoever it is, that we are going in for sheep and in twelve months' time we shall have one thousand to put on the market, and if you cannot take them in we will market them ourselves. The Burns Co. would be only too pleased to say, we are glad to have your advice and when you are ready we are ready to take them. The producer has to be in advance of the time when he wants to market his stuff. It is the same with everything. In the Kamloops district only recently, we were eating New Zealand mutton, and we were glad to get it, thankful to get it, because we should have had no mutton, but to-day one of my neighbours who went into sheep raising has changed all that. He took in a large number of sheep and tried to sell them to the butchers. The butchers did not want them—of course not. He came into the street market (and he was a gentleman born and bred, a gentleman by habit and environment) and he put on a white smock, took a steel and a

butcher knife and came into the butcher market and he was selling his lambs splendidly. That lasted one season. The next season there was an advertisement in the paper that "So-and-So" was coming into the market at a certain time and was going to give Kamloops a certain trade with spring lamb. From that day to this he has never been there. Pat Burns' buyer went in there and bought all he had. That man did not growl the year before but went and sold his lambs and the next year the buyer went to him bought it on the place, and the disappointment was not in the price paid him; the disappointment was that the public did not get it first hand. In a case like that the public have to look after themselves. Well, now the sheep industry is increasing, and I have approached Mr. Burns himself and shown him how part of his lease of 20,000 acres could be much better utilized, or one part of it anyhow, if he would put 1,000 head of sheep on it and supply the market of Kamloops with the home grown stuff. It is better for him to do this than to send his men over the line and bring the sheep in. They have to bring them right into the Okanagan Valley and take them to a depot in Vernon and other places and put them in cold storage, and of course they already have provision for cold storage and must fill up in one way or another. Can you tell me that a man with 100 or 50 carcasses to sell—and Pat Burns blocks him when he is living in Vernon or Kamloops—cannot sell them to the public who are ready to buy them. No, sir, it is in the hands of the producers themselves. If there is any business in them it is for them to organize and market their stuff. If they have not the ability themselves they must hire a man to sell it for them and sell it under their eyes with a daily or weekly accounting, and pay over the money realized on a fair selling arrangement. There is, I believe, the whole solution of the marketing difficulty.

Mr. Speakman spoke about the butter question of New Zealand. New Zealand has got the market for butter in the Old Country, but Denmark runs it pretty close. But also in such a dairying country as British Columbia and Alberta, it is a positive fact that one of the finest dairying countries in Western Canada is the Kamloops district. The New Zealand butter fetched 40 cents a pound, and is retailing at 45 cents, I think, now, and the stores in town, for instance the Hudson's Bay Co., we could not sell our butter to them. They say to the local producer, we cannot give you more than 25 cents per pound, but they are selling New Zealand butter at 40 cents. They say, Yes, but the public prefer it. Why? Because it is better butter most decidedly. Now I said to Mr. Moore, the Superintendent of the Agassiz Farm, "How long is this New Zealand butter in storage when it gets into Vancouver? There is a direct line of steamers. It takes a month to come across or three weeks from the time it is made until it gets on to our tables. "Is it three months," I said, and he said "Three months! why it is two years." It is a fact and he assured me of it, and he is an authority on such matters.

Do you mean to tell me that we cannot make good butter that will go fresh on our tables, and compete with butter made two years ago? Is it reasonable, is it sensible? There is this about it, that New Zealand has contracted

with the Old Country for thousands of pounds of butter and they have sent all they could and yet cannot fulfil those contracts. They have taken back all their butter out of storage from Vancouver and taken it back to send to the Old Country. There is another thing and the province of Alberta has benefited by it. The agents from New Zealand have gone to Edmonton and bought all the butter they could lay their hands on, and have sent it back to New Zealand or the Old Country. So if we as farmers living on the land and looking for the land to support us, to get our living out of the land, if we cannot face the competition along such lines, then I am inclined to believe what Mr. Dennis said at the Irrigation Congress last year, that we have not got the right men on the land, and we will have to keep on getting the right men on the land before we can do it.

I may say, in a small way in Kamloops, we have faced that competition and a friend of mine with whom I am associated has put up a barn for cows, where cows have hardly been kept before. He got a good man, as he thought, to make his butter. Some was taken to Pat Burns and he said, "do you call that good butter"? and it was taken back home and used for cart grease, or something of that kind. Another lot was taken to the Hudson's Bay store and they said they did not want such butter. The owner went into the whole thing thing to see what was the matter. He studied the matter and in less than a month he was turning out butter and after going to the Hudson's Bay store with some of it they said, "We will take all the butter of that kind that you can produce, for it is a perfect butter, and we will give you 35 cents a pound for it." I do not believe it is the market, or the labelling of the foreign meat or the labelling of the butter, but it is the men and the women on the farm, the right people who are determined that if they are turned down in one way they will make good in another.

CHAIRMAN: Just let me make one word of explanation about the butter business. I am not worried about it. We have been able to sell our Alberta butter for four cents a pound more than New Zealand butter was selling for here. The special grade of Alberta butter brought four cents a pound more than was paid to any other creamery turning out butter in Canada. We are now turning out the best butter. We took the prizes at the Toronto Exhibition, and got a premium of four cents a pound over three or four other provinces of Canada that are operating creameries. Some of them operate on similar principles to us. Now, we cannot get enough to supply the demand. Because of the quality, a poor grade demands a poor price, and there is a limited demand for it, but good articles mean a good price, and there is no limited demand here. Consequently, we are marketing to-day all the butter the government creameries are making, and also the private individuals we market for, which we do on conditions that they grade the cream out of which the butter is made, and we put a man in the creamery to set the grade for the cream.

Somebody said something about profits in connection with the farm. Just as soon as you establish a grade for cream in the creamery, and if it is not up

to a certain grade, understand that it will be sent back, the farmer will send in what is the proper grade. Take Ferintosh on the Grand Trunk; a shipment of butter from there to be marketed for them turned out, twenty were firsts, sixty were seconds, and the balance was off grade. Then we sent them word that we would only market butter on condition that they would grade the cream and allow our man to go into the creamery and establish a system. We did that. A month after grading was established, they sent in sixty per cent specials, and the balance was first and no seconds and no off grades at all. That is in just one little creamery in Ferintosh on the Grand Trunk.

The result of having grading of cream established in the creamery is that to-day we have no difficulty in disposing of our butter in the province of Alberta. Creameries have been increasing in number and creameries are opening up in many places. In our cities the milk companies would pay any price for milk and cream, and when a farmer was getting $2.40 for milk he would be foolish to make butter. If a man is making money out of real estate he is foolish to go into something else. Anyway, that is what the farmer did. Now, these fellows are not paying fancy prices for milk any more. Most of us in Edmonton are drinking water, with the result that dairying is getting back to its old basis, namely, making butter and cheese, with the result that our creameries are being re-established. I think that in the next three or four years, the creamery business of Alberta will be entirely different. Not only will the old creameries be opened, but a lot more will be running and the business of milking cows will be on a better footing than it has been for years.

We are not afraid of the New Zealand butter. We can beat them making butter, and we can put a better grade on the market and have a better way of marketing it. Why this year we marketed Alberta butter at a premium in the city of Montreal. That does not mean that they cannot make good butter down there, but they cannot make it as good as we can and we shipped the butter down there and sold it for more than any other creamery butter brought in the city of Montreal, and the same will apply largely to all farming operations.

It is just the same with the farmer raising stock, if he has not a good bunch of cattle he has to go chasing around looking for a market, as a farmer I know did. Last year he put in a good quality of cattle. This summer I saw two cattle buyers chasing around after him, and they wanted to pay him half a cent a pound more than anybody else was paid in the whole district. That is the way to make money. If you have a good bunch of steers you can sit at home and have these fellows just chasing around for you. If you have the quality there is no question about selling them. We have gone a good deal into marketing butter, still the whole thing resolves itself back to the question of producing the best quality of any article, and you will find no difficulty in people buying it.

MR. DENNIS: I have listened with pleasure to what you said, and I agree

with it. At the same time, Mr. Speakman has laid his finger on the difficulty we have in this country. We can no doubt produce good butter and steers, but is it not a fact that in this country where we can produce what you say is the best butter and the best beef that is grown anywhere and mutton too, I believe, the larger portion of the mutton, beef, butter that we eat in the country is imported. We know we can produce them, and yet our people are complaining that they cannot get a market for what they produce. Yet at the same time the larger percentage of mutton, butter, beef and eggs that we consume are imported. These are not theories. These are facts. You know it and I know it. Why should we be bringing in chilled beef from Chicago or the East? Last year we did not bring poultry. Last year Alberta produced sufficient to supply the province and also sufficient to ship some out. But we are to-day importing from all the other provinces and other countries. The only thing we have a surplus to ship out is wheat. We ship in mutton of all kinds and have been shipping in butter and have been shipping in eggs. Why, if that is the fact, should there be the slightest complaint on the part of any man in this country who is producing beef, butter, poultry, mutton and eggs, that he cannot get a market. There is trouble somewhere and without a doubt something will be done to correct that condition so that we won't have a market for anything from the outside until our market has been reached for the products at home. A great deal will have to be done by the producers getting closer to the consumer. We have complaints throughout the country that in this district they produce beef and cannot get a market, and in other districts it is something else and they cannot get a market. We have to get rid of this anomaly and get this country what it is intended to be, that those in it should not be paying toll to New Zealand or any other place for what we eat.

At the present time we have a lot of beef in this country that we are not able to get a market for. I do not think we are importing much beef. I think the beef concerns are able to supply our local demands. They complain they cannot get a market, that if they have a large margin over our beef has been shipping out on the hoof this year to Chicago. This was brought about by a large demand on the other side and as Mr. Speakman said this year in Ontario, they would have had difficulty if they had not filled French war contracts—that was filled by beef on the hoof from Montreal, but after that the contracts existing in the warring nations for live beef or canned beef or chilled beef stopped altogether. The British Government were asked to help out the situation by taking a lot of beef out of the West and they said we cannot; it is covered by contracts with the Argentine. At the present time the Russian and French Governments say, we do not want carcass beef; what we want is canned beef and the last week in September in New York there was a contract let to the Swift Company for eight million one pound tins to the French Government. We have not the facilities to fill that. If we had, Mr. Burns would not have eight thousand carcasses in his cold storage to-day.

Everything produced in this country should be used in this country before we start importing. I do not doubt that the butter you are producing in the government creamery is as fine butter as in the world, and the beef is

the same and the mutton is the same. We know what we can do with the produce of the soil, grain, etc., but we are not at the present time so situated that we are getting the marketing facilities for them and the producers are complaining, but at the same time we bring them in from the outside. In Manitoba, Saskatchewan, Alberta, and British Columbia, we are importing very large quantities of butter, mutton, eggs and poultry. They bring cream from Saint Paul and Minneapolis to Winnipeg and butter from the South into the Winnipeg market. We have brought even beef and ham from the Chicago packing houses and from the Eastern packing houses into Calgary and we are doing it. Last year about this time, we packed six refrigerator forty ton cars on the wharf at Vancouver from a ship from China and they were loaded with eggs from China for Toronto and Montreal, and we are complaining that we cannot get a market for our eggs. I think we should follow Mr. Speakman's lead and everybody should put his shoulder to the wheel and let us all try to solve this problem.

DELEGATE: Mr. Dennis was asking for a solution. The problem was settled by New Zealand some years ago. Why not follow them exactly in connection with beef, dairying and other things as well? New Zealand, as I know for a fact, is shipping every bit of beef and every bit of mutton that they can lay their hands on at much higher prices than we can get and the same with butter. Why not do the same as they do? There is the problem in a nutshell. Before I sit down I would like to ask, Mr. Chairman, on what system the dairies are run in connection with these creameries you mentioned a few moments ago. Are they run under government or private systems?

CHAIRMAN: If any company of farmers want to organize a creamery, if they will organize a company with $2500 stock subscribed (and it takes that to build a creamery equipped to handle the product of anywhere from five hundred to a thousand cows) the Government will loan the company a certain amount at five per cent interest to be paid back in ten years, in order to get the creamery started.

After the creamery is started, we have the Dairy Commissioner and three or four assistants to aid it. We have cold storage space leased in Calgary and Edmonton to handle butter, and we send a man to the creamery to establish a system of grading in the creamery and he stays there until they are well under way in the making of butter. Then we take the butter product shipped to us at Calgary or Edmonton and it is all graded there by a government grader and we market it for them and charge them with the actual cost of cold storage and handling. We give the services of the Dairy Commissioner and assistants free of charge. These services are paid for by the Government as we regard that as educational work to turn out first class butter product.

Then we offer to any private owned creamery in order to raise the standard of butter in Alberta, that we will market their butter for them if they will allow us to grade it. There were several very large creamery companies in Alberta that we made this offer to and they laughed at us when starting and

said they could do it as well as we could, but it took them just a year to find out that we could get a premium for our butter and they could not, and to-day we are practically marketing all the butter for the private as well as the government creameries.

We do not subsidize creameries in any way. We take the butter from the private creameries and ship it to the Calgary or Edmonton cold storage and we make them an advance of fifty per cent of the value when shipped in and the butter is graded and marketed for them. During the past year we handled eggs and this year we are making arrangements for poultry because the poultry companies in this province will steal 75 per cent of your poultry from you. I know that because they stole some ducks of mine.

DELEGATE: It just lies with the farmers or the Government starting this instead of the Swift Company or P. Burns having packing houses. I remember in New Zealand they were in the same way as you are to-day with stock. You could go from one end of the country to the other and find farmers' co-operative packing plants or freezing plants as we call them, and without that we could not get a decent price to-day. As soon as we get into the pig line and put them on the market, down goes the price, just the same as beef to-day. As soon as we produce it, it goes down. In the country they have orders for more than they can supply. It just lies with the farmers to go in for co-operation. That is the secret of the whole thing, both in the dairy and in the cattle line. I think if we want to follow the lead of New Zealand, and I saw it started in its infancy, we should have co-operation. Lots of people thought when they went into co-operation, that all the smaller settlers would go to the wall, but they are doing a better business to-day than they did before they got cash for their trade. That is what makes the New Zealand business what it is to-day. They fell down when they first started their co-operation, but if you keep in the same lines as they are to-day, you will make the success of it that they have done.

CHAIRMAN: The party is expected to meet here at 2.30 this afternoon to make a trip to see the Bassano dam. Those who have not seen this great structure will see one of the finest sights, I think, that we have in the province of Alberta. It will be worth your while to make this trip.

To-night on the programme will be an address from Mr. Hutton on grading up a dairy herd. Mr. Hutton has actually done this on the farm there and will speak from actual experience.

Mr. Hays, Chief Engineer of the Southern Alberta Land Company, will speak to-night on "Cost Accounting for Farmers".

With respect to farm book-keeping, this has been one of the serious features of agriculture and I have been wondering for years about getting a system that would be simple enough so that a man can understand it and be of some use to him.

I remember as a boy I attended a meeting of a Farmers' Institute in the county of Huron where a man lectured on book-keeping and they selected a

Scotchman to take the system home and use it for a year, and the man that lectured said he would come back the next year to see the result. Well, the Scotchman came back at the time appointed and swore that the lecturer owed him $800—that he had lost $800 by this system of book-keeping.

I might say that we have discovered a man in the province of Alberta, from British Columbia, by the way, some good things do come out of British Columbia. He has put in a cost system in connection with our demonstration farms which is the first cost system I have ever seen that is worth anything. We are able to find out exactly what our milk costs per gallon to produce and butter per pound. He is a wizard in book-keeping, because he is the only man on earth who understands real book-keeping. We have had him working for the last two months on a simple system of book-keeping that can be put on the farms and that a boy can keep, and he says he is rather surprised himself with it and he certainly has surprised us. He says he got all the knowledge and information from the Department of Agriculture from our men and that it was through talking to the men who did the farming. I believe we are going to be able to give to the people of the province of Alberta a real simple system of book-keeping that will enable a man to find out whether he has gone broke at the end of the year or not, without asking his banker.

I had no intention of saying anything about this only I saw this address that was to be given to-night. If any of you desire to get a set of these books from the province if you will send your names in to the Department of Agriculture at Edmonton, arrangements will be made to send same to you.

We will now adjourn to eight o'clock this evening.

EVENING SESSION—NOVEMBER 24TH, 1915.

Mr. William Pearce, Chairman.

CHAIRMAN: This evening's session will be opened by a paper by Mr. Hutton, of Lacombe. (Applause)

MR. HUTTON: Mr. Chairman, Ladies and Gentlemen,—I have to-day had the pleasure of visiting the source of water for quite a large area of this part of the country and was very much impressed with the size of the work there, and I am sure it will mean a great deal for this part of the country. I was wondering what connection there might be between water and dairy products but while I was thinking of that I remembered one or two cases with which I was familiar where some objection had been made on the part of the consumer to the irrigation of the product of the dairy cow as practised by the vendor of the product in our city.

I am sure from the mottoes on the wall that live stock means: Alfalfa, clover, rotation of crops, richer land, better crops, more profits, feeding the crops, saving the fertility, less washing of the land. So that there is a definite connection between live stock and the irrigation projects and works which we have been studying and considering for the past two days, and indeed I

noticed that greater emphasis was placed upon live stock as a means to successful and profitable irrigation farming than on almost any other development of that kind of farming. Now the topic I have to discuss with you this evening is

"GRADING UP A DAIRY HERD."

The main facts in connection with animal breeding are so well understood that it would almost seem a waste of time to give consideration to the advisability or importance of the use of pure bred sires in animal breeding. Talks on the importance of this work have been so frequently given that apparently the minds of those for whose benefit the questions are given consideration have become so calloused that the reception of the ideas submitted is rendered difficult. Those who should benefit cast aside the ideas as being of little importance and the product of the minds of those whose business it is to prepare such articles. That this is the case is shown by the fact that the improvement in the annual output of the dairy cows in Alberta is so slow. Had the vital truth of statements similar to those I am about to make in regard to the possible improvement of dairy cattle been grasped and acted upon by the farmers interested in dairying in this country, we should have had in Alberta an average production of from five to six thousand pounds per annum instead of the thirty-eight hundred pounds with which we are apparently content, and which represents the brains and intelligence given by the dairymen of the province to this question. It would appear then that the average dairyman is not exercising his brains to bring about improvement. I would be glad if it were possible for me to so emphasize the practical possibilities of improvement that every man who keeps cows for the production of milk would be induced to adopt those practices which would bring about such improvement. Why should the average man be content with the production of thirty-eight hundred pounds per annum from his cows when he could without proportionate extra expense as to feed, be getting six thousand and even more than that? By extending his ideals he could reach a maximum of ten thousand pounds per cow per annum. Why do we work year after year to produce feed for the thirty-eight hundred pound cow? It seems to me that the same ambition which rendered the settler of this province dissatisfied with conditions in the province or state from which he came, should also force him to reach out for that sort of animal that will produce two or three times the present average output of Alberta's dairy cows. Here we have a soil which is enriched by the stored up energy of generations of plant growth and is so remarkably productive that this year we are hearing reports and witnessing the actual yields of grain which will be considered impossible by many farmers who are residents outside this fertile area which is designated "Alberta". If then we have such a fertile soil, should it not be the aim of every farmer to keep cows whose possibilities for production are as great as the land on which they are kept. The keeping of cattle of this class would enhance the cash returns and would insure the continuance of the fertility of this land up to the present high standards. Thus,

the productive soil which we now have and the high producing cows which it is our privilege to secure, would establish our farmers on the land and enable them to build up homes on the farms that would be handed down to the generations as a heritage, of which each successive generation might well be proud. This idea of home building on the land is one which strongly appeals to me, as I believe it is an idea which must be more firmly planted in our minds else we will have a depleted soil and a changing agricultural population, and will not have that pride in agriculture, that permanence in our home building, that consideration for beautifying these homes and making them attractive, which will tend ultimately to establish in Alberta a type of citizenship which will do more for the province than any oil boom or any other of our natural resources, however genuine or valuable. Our trouble seems to have been that we have been searching for something which has been hidden and have failed to realize that the country's greatest wealth consists of our rich soil which requires only a small investment for its profitable development.

I wish to present to you some figures we have secured at the Experimental station, Lacombe, which go to show the improvement which can be brought about in dairy cattle by careful breeding.

Nominally, men are supposed to keep cattle for the profit they get out of them, but in reality many must keep them for the privilege of associating with cows. Where the average production is only thirty-eight hundred pounds it necessarily means that there are many cows in the province that do not produce twenty-five hundred pounds, and the cow, which is milked for the whole lactation period and during that period produces only twenty-five hundred pounds, is not a profitable cow. She is a boarder and every year she is kept means a loss and the man who keeps her must charge up a great deal to her credit because of the fact that she keeps him from being idle and so keeps Satan from finding mischief for his otherwise idle hands. This is about the only way in which I know a profit could be figured for a great many cows which our Alberta dairymen are providing with bed and board.

As I have stated, we have some figures here which show what can be done to remedy this state of affairs. We have here three charts, giving the production of three herds of dairy cattle. The first chart shows the production of cows which were purchased with the idea of securing a herd which would represent a common dairy herd. This herd is, however, not so common after all, as the average production is about three thousand pounds higher than the average production of the province. The high grade herd of Holsteins under the same conditions of feed and shelter produced in the same number of days over two thousand pounds per head more than the common grade herd, while the pure bred herd produced about thirty-two hundred pounds more during the lactation period, averaging the same number of days.

In order to amplify the figures here presented, we have had under way during the past two years, an experiment to further show the importance of breeding in increasing the production of dairy cattle. This common grade herd is being bred to a pure bred Holstein bull, whose dam has a record of

eighty-six pounds of milk per day for thirty days, testing an average of four per cent fat. As he is a grandson of Pontiack Korndyke, there are many cows in his pedigree showing a production of more than thirty pounds of butter in seven days. His own immediate dam has a record of only slightly under thirty pounds in seven days. A bull whose pedigree shows as large a number of high producing dams as this one should prove prepotent, and we are hoping that with such a bull constituting one side of our herd and with these cows whose average production for the last year was between six and seven thousand pounds constituting the other side of the herd, we will secure some figures showing exactly what advantage a pure bred bull will have when used on individuals whose records run from three thousand pounds upward. We expect to add additional demonstrative testimony to the advantage of use of a pure bred sire on our common cows.

The first chart shows the production of the common grade herd and all of the animals of this herd are matured cows. It will be noticed that the records show extreme variation, a variation much greater than will be seen in the two other herds, which have the advantage of both breeding and selection. Cow number four in this herd has a record, as you will see, of only slightly better than three thousand pounds, but she gave about nine hundred pounds of this total production in the first thirty days. Had we not been weighing the milk, this cow's fairly liberal production on the beginning would have resulted in the impression that she was well worth keeping. These figures illustrate the truth of the statement that an intimate knowledge of individual production could be obtained only by weighing and testing the milk from each individual in the herd. The use of the scales—the "weighing in the balance" of the product of each cow—is the only means of arriving at a true estimate of the individual worth of each animal. By adding to a knowledge of quantity, information as to quality by the use of the Babcock Test at least once a month, the commentary as to merit is complete as far as production influences profit. The records of feeds consumed will then furnish full data for guidance.

Let us now turn to the chart showing the production of the high grade Holsteins as illustrating the evolution which may be brought about by the use of good bulls. Of course, as you will notice, the lactation period is longer in this case than in the case of the other herds whose records are shown on these charts. This long lactation period is explained by the facts, first that these were heifers with their first calves and we therefore wished to establish in them the long milking habit; and second, we wished to hold them over for calving the second time this fall. We are willing to concede that the long lactation period gives these heifers a distinct advantage over the other herds, but not sufficient advantage to lower their record below favourable comparison with the common grade herd.

In the pure bred herd there is one mature cow whose record is shown. The lactation period is about average and yet though nearly all the animals whose records are shown are heifers, the average production for the lactation period is 10013.9 pounds, with an average per cent fat of 3.18. Had the records of

the high grade heifers been computed for the same length of time, the production would have been 8649 pounds and the production of the three herds would then stand as follows: the common grade herd 6885.7 pounds, the high grade herd (for the same length of lactation period) 8649 pounds, and the pure bred herd 10013.9 pounds. These figures carry greater weight than any argument or general comment which could be made in favour of the use of pure bred sires.

By careful selection of the head of our breeding herd, by careful weighing and testing the milk from each cow in the herd, our dairymen will rapidly change the figures showing the annual production of the dairy cows of Alberta by increases of 25, 50 and even 100 per cent. "Let us slumber not in the tents of our fathers". The world is advancing.

TABLE NO. 1.

RECORD OF COMMON GRADE CATTLE AT THE DOMINION EXPERIMENTAL STATION, LACOMBE.

Name or No. of Cow	Freshened	Pounds Milk	Butterfat
Grade No. 1	January 13, 1915.	260 6418.8	3.6
Grade No. 5	March 13, 1914.	293 4993.9	4.4
Grade No. 4	May 20, 1914.	166 3011.3	4.0
Grade No. 7	March 2, 1914.	573 12506.4	3.9
Grade No. 30	July 17, 1914.	440 8493.4	4.0
Grade No. 31	May 2, 1914.	383 4988.8	3.6
Grade No. 33	Dec. 24, 1913.	341 4401.3	3.0
Grade No. 34	Dec. 27, 1913.	613 10272.2	5.2
Average		6885.7	3.5

Average No. of Days in Lactation Period.....341
Average Pounds of Milk Per Day.....20.1

TABLE NO. 2.

RECORD OF HIGH GRADE HOLSTEINS AT THE DOMINION EXPERIMENTAL STATION, LACOMBE.

No. of Cow	Freshened	Pounds Milk	Butterfat
Grade No. 11	December 7, 1913.	594 13319.5	3.7
Grade No. 12	April 19, 1913.	499 13635.8	4.2
Grade No. 13	March 31, 1914.	403 8430.2	3.8
Grade No. 14	January 12, 1914.	478 10361.4	3.4
Grade No. 15	Dec. 22, 1913.	517 11997.6	3.9
Grade No. 17	Dec. 11, 1913.	569 10201.2	4.4
Grade No. 18	Dec. 1, 1914.	304 7198.1	3.5
Grade No. 19	Feb. 4, 1914.	457 8276.1	3.4
Grade No. 20	March 17, 1914.	533 13528.2	3.7
Average		10772.0	3.7

Average No. of Days in Lactation Period.....483
Average Pounds of Milk Per Day.....22.3

TABLE NO. 3.

RECORD OF PURE BRED HOLSTEINS AT THE DOMINION EXPERIMENTAL STATION, LACOMBE.

Name of Cow	Freshened		Pounds Milk	Butterfat
Daisy Johanna Ormsby	Oct. 29, 1914.	343	10605.0	3.4
Lawncrest Lee Beets	May 5, 1914.	338	13824.2	3.1
Lawncrest Rosa Echo	June 6, 1914.	318	10240.0	3.3
Lenore Del Berke Star	Mar. 23, 1914.	381	10091.1	3.4
Maud Sarcastic	Mar. 2, 1914.	230	7233.8	3.0
Nina Gem Lutske	April 15, 1914.	301	12038.8	3.1
Princess Margaret Helbon	May 14, 1914.	504	10814.3	3.1
Rhoda DeKol Beets	Sept. 10, 1914.	269	7364.2	2.8
Vrouka B. 3rd	Aug. 3, 1914.	335	7914.5	3.5
Average			10013.9	3.1
Average No. of Days in Lactation Period			335	
Average Pounds of Milk Per Day			29.8	

MR. LAWRENCE: I would like to ask a question of Mr. Hutton. Is there any arrangement made in his particular district that struggling farmers desiring to develop on the lines he lays down can have the use of pure bred sires and if so what is the arrangement?

MR. HUTTON: The male calves which are produced at the Experimental Station are for sale at reasonable prices considering the records of their dams. If a man does not care to buy for himself a pure bred sire, the Dominion Department of Agriculture has a scheme by which he can secure pure bred sires through organization of a band of farmers to enter into an agreement with the Live Stock Commissioner for the Dominion of Canada and a pure bred sire will be sent to them without charge. I do not know that that is a good business. It may be a good way to start. It may be there are communities where no one man is able to purchase a pure bred sire. If there are such communities, then the scheme is valuable and there are a number of communities that have taken advantage of that idea. But, I believe that if a man has funds to purchase he will take more interest in his herd and he will study pedigrees closer and take more interest in knowing what he is getting than if he gets something given to him. That is my idea of it, but the other means is available for securing pure bred sires if wanted.

MR. JOHNSTONE: I have taken the speaker's advice for the past twelve years. I have a pure bred sire and pure bred cows, but I have reached a stage now when I have more stock on my ranch than I can take care of. I would like to sell them. I used to be in Kentucky and I had lots of horses and mules and have a very good recollection of the horses I had to buy. Now, everybody comes to me for a cow and of course knowing of my good cows and also of my bad cows as I do, I do not want to dispose of my good cows. Now how do you dispose of your bad cows?

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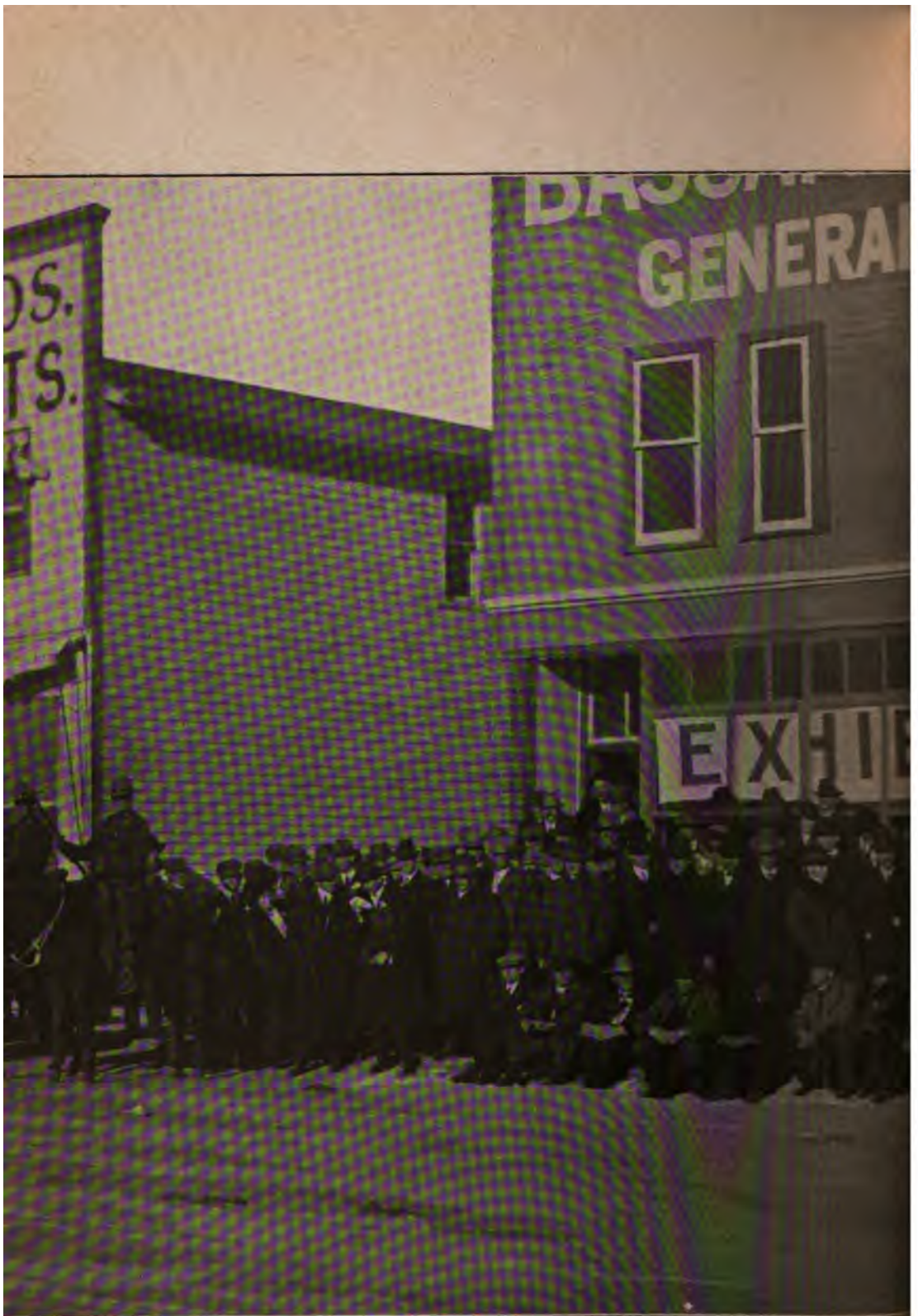

Delegates to the Convention, Bassano, 1915.

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MR. HUTTON: We have a bad cow, a pure bred, with a record on chart as 7,000 pounds. She weighed about 1755 and she will bring something as beef and that is the way we intend to dispose of her. Your average bad cow having been working along these lines for twelve years will be much better than the average cow that a man can buy elsewhere, and I would not hesitate to tell the man the record of the cow that she was not good enough for me but her record was better than the average cow in that country and I want so much for her and if you want to take her on that understanding you can have her.

MR. JOHNSTONE: I have tried to sell her for beef, but people go to other farmers in the district and buy worse cows from them.

MR. ABBOTT: How is it that percentage of butter fat in milk and cream in pure bred cattle is even less than in the common grade?

MR. HUTTON: You will note that when the Holstein cow was first imported to this country, butter fat was very low and that is responsible for the belief that the Holstein cow of to-day gives milk little better than coloured water. I think every one is free to admit that there has been since the Babcock test became more generally used, a gradual improvement in the butter fat contents of Holstein milk, but I am free to say that, in my own opinion, we cannot get or are not likely to get a better butter fat test from a herd of cows that will produce ten thousand pounds or over than we will get from cows giving three thousand pounds or less. They have only a short time to give milk. Some have been bred for generations to that. One of this herd came from a family of beef producers that for generations raised a calf and gave it a fairly good start in life and let it go. That cow tested 4 per cent, but I believe it is possible and I believe producers of Holsteins and Ayrshires as well are improving the butter fat content of their product by selection. When we made the chart here you will notice the test for pure bred herd was shown as 3.1. It could almost be 3.2; 3.18 is the figure that should be on the chart. While we admit the butter fat test is lower than the grade herd, yet the total butter fat of the herd outran that of the common herd.

We have a small herd of Jerseys, but we are not trying them in the same way. We are handling grade cows to Jersey sires. I believe the figures we will get will apply with the same force no matter what breed we might select. I think if you used an Ayrshire sire of high breeding family you will get relatively the same results. We are not using Holstein cows, because we think they are best breed. The argument we use is that the pure bred sire of no matter what breed selected, will bring about improvements.

MR. JOHNSTONE: Some time ago I had a young sire I wanted to sell, also an old one. I found the Government advertising for sires to be distributed around the province, but they said they did not want anything over five years. Now I am rather a greenhorn at this business and I hold that you do not know what sort of sire you have at five years old. At one time I used

to buy a cow because its mother was good. Do you consider when you have apparently a good sire you should use him when he is old or at what age?

MR. HUTTON: Personally, if I had an opportunity of buying an improved sire he would be proven, and in both our herds that was the beginning we made with aged sires proven. Of course, some men do not want an aged sire because they think they cannot handle them on account of their temper. Personally, I prefer an aged sire. I would keep the aged sire until he was twelve or perhaps older. I do not think I would hesitate to keep him so long as he was giving perfect satisfaction.

MR. PEARCE: Have you ever experimented with the milking strain of Shorthorns? I made a hurried visit to Australia and New Zealand two years ago, and I was agreeably surprised to find that the very large percentage of cattle in that country was a breed of milking Shorthorns. As a boy, my father had some and they were good milkers. I have been making enquiries since and find it is difficult to obtain them in this country.

MR. HUTTON: I only know of those herds that the Provincial Government is maintaining. If there are others, I do not know of any of them. They have a herd at Sedgewick which I looked over last year, and the animals were a pleasure to look at. They have animals running ten to eighteen hundred pounds and I don't know but what some are higher than that. For the man who has free grass, as so many men have who are keeping dairy cattle in our part of the country and also here, there will be a Hudson's Bay section and a school section or some speculators' land adjoining where plenty of grass grows costing nobody anything, I believe that the dairy Shorthorn has a very decided place, because the calves raised to steers will produce first class beef at profit and the cows can be milked, and certainly an eighteen hundred pound cow is sufficiently profitable to justify her being kept and one that will produce a good calf, I would also keep.

I have been asked by men who come to me for advice and say that they want to go into dairying, as to whether I would recommend keeping a Jersey, Holstein or Shorthorn and I have recommended the dairy Shorthorn. One man who came to me seemed to have a very wide open mind as to what he should keep. He stated he had 1200 acres of open land near him and nobody was using it, and he wanted to be in the dairying business because he wanted to study a regular income month by month. I said I would certainly recommend a dairy Shorthorn herd for that man, and I certainly think that that breed has a place.

In these records, as I have stated, we are not advocating any special breed. I believe a man should select the breed that he has a personal liking for. It is a matter of selection of breed as much as anything else and if a man is working along the right lines he will get results no matter what breed he is working with, and if a man has free grass and wants to raise dairy cattle and is in a position to look after them, I believe that a Shorthorn is a first class animal

for him to secure. No doubt the breeders finding that there is a demand for this class of cattle will place themselves in a position to supply that demand.

CHAIRMAN: Before calling on the next gentleman to deliver his address, I would announce that the Committee on Credentials will please be ready to bring in their report at the morning session, probably immediately before the close of the session to-morrow morning or shortly before.

There is another announcement I desire to make and that is a good many gentlemen here who for various reasons are particularly anxious to leave Bassano on the mid-day train, have asked for a decision as to the point at which the next Convention would be held. This matter will be brought on in the forenoon, and if there is no objection on the part of any one in the audience, the programme will be varied to meet that request. Is there any one here who objects to that change?

(No objection.)

MR. LAWRENCE: I take it that that question will come on immediately before the adjournment for lunch?

CHAIRMAN: Yes.

I will now call upon Mr. D. W. Hays, Chief Engineer, Southern Alberta Land Company, who is going to address us on "Cost Accounting on the Farm".

MR. HAYS: A system of accounting has been kept by the Southern Alberta Land Company which gives a very detailed record of the various costs of farm operations, and I have been asked to prepare a paper setting forth the system in question, to be presented at this Convention.

The system referred to is developed from a system used in construction work. Its purpose was to find the cost on different construction works, and at the same time the cost of the great number of labour operations and materials and supplies which are a part of construction works. This information is required firstly, to account for money expended, and secondly, to place the man who is responsible for the work in a position to know each week or month the relative cost of work done by different superintendents, camp foremen, etc., so that a comparison can be obtained of the relative merits of the different men to accomplish work, and thirdly, to know from the comparison which is available where to look for waste and defects. Such comparisons when placed before those doing the work naturally encourages the man who has deficiencies to overcome to do better and prompts the man who has done well to maintain his standard of usefulness. These results are attended by improvements in methods and stimulate active work.

A description of the system referred to as related to farm costs would no doubt be of interest to any company operating on a sufficiently large scale to require the use of a book-keeper. Any system of accounting to obtain any definite conclusion as to the costs of farm operations would be practically as extensive on a small farm as on a large one, the difference being that the larger farm deals with larger figures, but not necessarily more detail.

In presenting a paper before this Convention it is advisable that its contents should be applicable to the service of the majority of those who may be in attendance. To present a paper on the question of farm accounting descriptive of a system which might be useful to the man who farms and who also has to do his own book-keeping, naturally requires that it should be simple and require the least amount of time. This is not easy to do, and my best efforts in the matter will I am afraid frighten a good many who have any idea of undertaking the task; but I undertake the description with the thought that if any individual sincerely wishes to keep a reliable record of costs for various farm operations, he is willing to devote a certain amount of time to the purpose. The system, as I will explain it to you, may from the description given, appear too elaborate and be difficult to use. It is not, however, as difficult as it may appear, and anyone by a little study will find that it will not take up more time than any other system of book-keeping.

Accounting is a matter of arithmetic, a knowledge of what debit and credit means, and not least of all thoroughness, and by the latter I mean prompt and correct entry of any business transaction as the item occurs. You cannot expect to carry your business transactions in your head to be entered up to-morrow or next week when you think you have more time. Such delays lead to omissions and errors, and any sort of book-keeping that is unreliable is worse than no book-keeping at all. It may lead to a quarrel with your neighbour, your banker, or your merchant, to say nothing of the fact that your efforts to fulfil your original intention of keeping accounts is a waste of time

I think that I am not exaggerating in the statement that nine out of every ten farmers have little other knowledge of the result of their farming operations than that they owe a certain amount at the bank or that the bank owes them for deposits they had the good fortune to make some time preceding. A good many will not know what they owe at the store, they may have an occasional slip or two for goods furnished and they pay when the crops are sold on a statement furnished by the book-keeper at the store, on which appears the item "To Accounts Rendered". You have long since mislaid the bills, but because you think the man who runs the store, or his book-keeper, is all right, and you remember having gotten certain things, you conclude that you must owe what the statement says, and you pay.

You have all no doubt heard references to someone's success in business, with remarks that it was "luck", "good investment", or "good business", and each of the reasons or any other which may be offered, come down to the one reason, "good management", and good management means to know that what you are doing will make money.

In the manufacturing world at the present time there is the keenest competition in the sale of all manufactured products, and every manufacturer is endeavouring to cut down his costs, and at the same time he must maintain a certain high standard of goods. His profits, or even his ability to stand the test of keen competition, must be based on a definite knowledge of the cost of each and every part of any commodity produced, and the success in this is

dependent upon his position to detect and prevent leaks, wastes, and other defects which will take a share of his profits. He does this by careful analysis of costs. There are a number of systems used by railroads, manufacturers, big contractors, etc., that supply the information needed, but there has been little or no effort to apply the same business principles for the assistance of the farmer in his line of operations. It is frequently said that a man who keeps good records and accounts will never go broke. He knows where he is losing money, and common sense will tell him to leave unprofitable things alone. This statement cannot be used better than in its application to the interest of the farmer. If you can make money as a result of good accounting, why not make that specific work a part of your business in farming and devote as careful attention to it as you would to any other farming operations. I cannot emphasize too strongly that any system of accounting requires diligent attention. No half-way attention will give you results and without results your efforts are waste of time.

Every book-keeping system requires the use of ledgers. Where personal accounts only are being kept, that is accounts dealing with people with whom you are doing business, a "Personal Ledger" is used only. With large business concerns, records are kept in a "General Ledger" which deals with impersonal accounts such for example as stock, inventories and miscellaneous items with which the book-keeper desires to obtain record and results of certain business transactions. When both ledgers are kept it is known as the double entry system, the handling of which is simple to every accountant.

The information most useful to the farmer would be a knowledge of what various farming operations may cost. Such information would be valuable to the farmer, as it may point out what operations are least profitable, and if the cost accounting is made in sufficient detail, the records will point out certain particular items of cost that have made that farm operation unprofitable. With such knowledge it is indicated where improvements are required.

Any cost-keeping system should have the merit of meeting established principles of book-keeping. Where used by large concerns the cost-keeping records must be part and parcel of the accounting system as a whole. For a complete set of books as would be required by a large company, three ledgers would be necessary, Personal Ledger, General Ledger and Cost Ledger. These might be all under one cover in a loose-leaf book if the amount of business done was not too great. Every business transaction would be shown in two of the ledgers, which is the ordinary double entry system.

The system of cost-keeping as hereinafter described will meet these requirements, but to the farmer or any one not responsible for certain complete returns, as in the case of a large company, it is not necessary that he should bother himself with all the various records, ledgers, balance statements, etc., that go to make a complete set of books. It is the purpose of the following description to set forth only that part of the complete system as will be serviceable to a farmer to keep track of his money transactions and to ascertain what farm operations cost.

DESCRIPTION OF COST-KEEPING SYSTEM.

VOUCHER RECORD.

The system requires the use primarily of a sheet called a "Voucher Record". The voucher record gives a record of purchases and sales and shows the classification of expenses and receipts to the various accounts which you may desire to keep. It is essentially a memorandum of your business transaction, and if properly kept furnishes sufficient information by which any book-keeper could at the end of a month or end of a year, complete all ledger accounts and make complete and proper returns for every account.

A representation sheet of a voucher record is shown below:

VOUCHER RECORD. FOLIO NO. 1

MONTH OF AUGUST, 1915

		Account Charged or Credited	Cost Ledger Dr.	Cost Ledger Cr.	General Ledger Dr.	General Ledger Cr.	Personal Ledger Dr.	Personal Ledger Cr.
John Smith	Aug. 2							50.00
		47	30.00					
		25	20.00					
Bassano Trading Co.	Aug. 15							120.00
		Stores			120.00			
	Aug. 25	Stores				60.00		
		47	60.00					
Time-book	Aug. 31	Labor				27.50		
		2	14.25					
		3	2.75					
		44	10.50					
		Living Expenses				6.00		
		Labor			6.00			
John Smith Cheque No. 10	Aug. 31						50.00	
		Cash				50.00		
			$137.50		126.00	143.50	50.00	170.00

GENERAL CLASSIFICATION SHEET

MONTH OF AUGUST, 1914. SERIES 40

	Folio 40	Folio 41	Folio 42	Folio 43	Folio 44
					1 10.50
Totals					$10.50

	Folio 45	Folio 46	Folio 47	Folio 48	Folio 49
			1 30.00 1 60.00		
Totals			$90.00		

Note:—These sheets in a loose leaf book are used as a memorandum to add up the figures chargeable to any Account Number as the items are taken off the Voucher Record. The total under each Account Number is then transferred to the Cost Ledger.

It is necessary in accounting and particularly if you desire to keep cost accounts, that you should show when you make a purchase just what that purchase was for. The Voucher Record has three columns headed respectively, Personal Ledger, Cost Ledger and General Ledger. Every transaction must appear under two of the headings. This is for the purpose of showing where you got the item of expense and then what you did with it or what it was for.

For example, referring to the representation sheet of the voucher record, suppose you bought goods from John Smith's store amounting to $50.00, you would enter on the Voucher Record a credit to John Smith and as the account is "personal", you would show $50.00 under the heading "Personal Ledger". Supposing $30.00 out of the $50.00 was for binding twine and $20.00 for groceries. The Binding Twine was bought say for Oats and the groceries are naturally Household Expenses. You would therefore enter against the item "Growing Oats" a charge or debit of $30.00 and against Household Expenses a debit of $20.00. These are placed under the heading of Cost Ledger because they are items of expenses definitely chargeable as a cost against these respective accounts. This would balance your credit entry first made to John Smith and shows what you have done with the goods bought. When you pay John Smith you enter under the heading "Personal Ledger", John Smith debit to $50.00 and to balance this you enter under the heading of "General Ledger" a credit to "Cash" $50.00.

Cash is an impersonal account and is therefore placed in the General Ledger Column. You will observe that every entry made requires that a like

amount be entered up on the opposite side in one of the other ledgers. A debit entry is always balanced by a credit and vice versa. The sum of the debits under all three of the Ledger headings will balance the sum of the credits.

It is presumed that in almost all cases when a purchase is made that it is for some specific purpose, and as such could be directly charged out to some particular feature in the Cost Ledger with which you are keeping accounts, as in the case of items just mentioned. If, however, you were to purchase goods, and you did not know at the time of making the purchase just what the articles might later be used for, it would be necessary that you keep track of the expense for the goods in a special account for the purpose. Such an account would be an inventory account, and as such is an impersonal account that would be entered up in the General Ledger. It naturally could not appear as a "Cost Ledger Item" because for the time being you do not know for what the articles in question may be used. These are reasons why the General Ledger is required, and unless every purchase of goods is made for some specific purpose to which it can be charged in the Cost Accounts, the use of General Ledger Accounts are necessary. As an example of the foregoing method of handling such accounts, suppose you purchased from The Bassano Trading Company one thousand (1,000) Grain Sacks for $120.00, and you do not know at the time for what purpose the sacks may be later used. You would credit The Bassano Trading Company under the Personal Ledger Heading in the usual way and charge the same amount under the General Ledger to, say, "Stores". This would be an inventory account and you are holding yourself responsible for the value of the sacks until you have use for them.

Later you may use 500 of these sacks for Oats; then you would credit the "Stores" account with 500 sacks $60.00 and charge to Oats. The remainder of the sacks would be left in the Stores Account until you had further use for them, when you would again relieve the Stores Account by credits and debit to whatever purpose the sacks were used.

Cost-keeping can be very much simplified if every purchase made can be directly charged out in the Cost Ledger to some account for which the expense was required, then no account of the character of stores would be required in the General Ledger. If all purchases cannot be charged direct to the work, then the Stores Account is necessary if correct costs are to be obtained.

COST LEDGER.

All accounts that you desire to keep relating to the cost of any particular farming operation or in fact relating to any expenditure whatever on the farm, may be divided up under special headings as "Capital Expenditure, Farm Maintenance, Living Expenses, Livestock Operations or Various Crop Growing, etc." These are kept in a Cost Ledger for which a special ruling is made in vertical columns, so that the cost for each month and the total cost to date can be obtained for any feature.

A representation sheet of the Cost Ledger is shown.

MONTHLY COST LEDGER

CAPITAL EXPENDITURE FEATURE

Acct. No.	Classification	Month of Aug., 1915. This Month.	Month of Aug., 1915. Total to Date.	Month of Sept., 1915. This Month.	Month of Sept., 1915. Total to Date.	Month of Oct., 1915. This Month.	Month of Oct., 1915. Total to Date.
1	Buildings,						
2	Wells, Roads, Fences, Trees, Lawn and Miscellaneous Improvements,	14.25					
3	Breaking Land	2.75					
4							
5							
6							
7							
8							
9	Depreciation						
	TOTALS	$17.00					

MONTHLY COST LEDGER

GROWING OATS FEATURE

Acct. No.	Classification	Month of Aug., 1915. This Month.	Month of Aug., 1915. Total to Date.	Month of Sept., 1915. This Month.	Month of Sept., 1915. Total to Date.	Month of Oct., 1915. This Month.	Month of Oct., 1915. Total to Date.
40	Ploughing, Discing and Harrowing in Preparing Land for Seed,						
41	Fertilizing						
42	Seed						
43	Seeding						
44	Harvesting	10.50					
45	Marketing						
46	Miscellaneous Labour						
47	Miscellaneous Materials & Supplies	90.00					
48							
49	Depreciation						
	TOTALS	100.50					

A page is devoted to each particular feature, as for example the feature headings given above. Under any one of these headings there are required various labour operations and various materials and supplies that enter into the total cost, with which you may desire to keep account. These items are called "Classifications", and for convenience are dealt with by Account Numbers. By the use of numbers you can quickly refer to charges as they may be marked on bills, or make any necessary entries without having to write a long description of some particular classification of work or materials.

Suppose you desire to keep the cost of Capital Expenditure on your farm. You might group all charges under one number, say Account Number 1, Farm Maintenance might be Account Number 2, and so on, but if it was desired that the cost of the various things that go to make up the total Capital Expenditure charge should be segregated, they could be itemized under a group of account numbers, say 1 to 10, as follows:

FEATURE:—CAPITAL EXPENDITURE (this would be the Ledger Heading).

Acct. No.	Classification
1	Buildings
2	Wells, roads, fences, trees, and miscellaneous improvements.
3	Breaking land.
4	
5	
6	
7	
8	
9	Depreciation.

Under this classification you will note that Numbers 4 to 8 are not used. These are purposely left so that should any new item of cost come up under the heading "Capital Expenditure", there would be a place for it. As for example, say that after making the above classification it was found that you wished to grade or level land and put in a drainage ditch. In the space left for Account Number 4 you could write "Grading and Leveling", and after Account Number 5, "Drainage".

Assume that another cost account is "Growing Oats". The whole cost of growing oats may be bulked under one number, as, say, No. 4, but if you desire to know the cost of various operations necessary to grow oats, say on a one hundred (100) acre tract, a classification might be made as follows:

Account No.	Classification.
40	Ploughing, discing, harrowing, etc., in preparing land for seed.
41	Fertilizing.
42	Seed.
43	Seeding.
44	Harvesting, Stooking and Threshing.
45	Marketing and Freights.
46	Miscellaneous Labour.
47	Miscellaneous Supplies and Materials.
48	
49	Depreciation.

These classifications may be as extensive or as limited as desired. The number to represent various labour operations or other classifications should be decided upon, depending upon what each individual thinks will serve his purpose. It does not take long before they are fixed in the memory, and when any item of expense comes up it is at once thought of as coming under a certain number. The same number can be used year after year. It is good policy to set aside a certain series of numbers to be used for special purposes. They may not all be used, but if the cost of some particular thing is wanted, there is room provided within the series. The Account Numbers should be arranged to come in logical order for particular purposes, otherwise confusion would result in irregularity of numbers used under any particular feature, and trouble result in finding the number on the Cost Ledger Sheets for the purpose of making an entry.

LABOUR CHARGES.

Nearly every person who hires men keeps a time-book. This certainly is always done by anyone who hires day labour, and it should also be done when hired men are paid on a monthly basis. In order to classify labour costs for various farm work done, a time-book is ruled to provide a column in which to place an account number to represent the particular work done on any day by the man working. The ruling of the time-book is shown here.

SHEET NO. 1 TIMEBOOK MONTH OF AUGUST

No.	NAME Occupation	Acct. No.	1 2 3 4 5 6 7 8 etc.	Total Time	Rate	Amount Earned	Total Earned	Board	Stores	Rent & Hospital	Total Deductions	Amount Due
1	Johnston, H. Laborer	2	x x x	3	2.75	8 25						
		44	x x	2	"	4 50						
		3	x	1	"	2.75	15 50	3.00	-	-	3.00	12.50
2	Brown, J. Laborer	2	x x x	3	2.00	6.00						
		44	x x x	3	"	6.00	12.00	3.00	-	-	3.00	9.00
							$27 50	6.00	-	-	6 00	21.50

Summary Acc. No.	
2	14.25
3	2.75
44	110 50
	$127.50

At the right there is a column for "total time", in which you enter the sum of the number of days worked under any particular account number. By applying the rate of wages, the column following shows the amount earned for each class of work done—the total of this column, of course, being the amount earned by the man for the month. Following the column "Amount Earned" you will note columns for deductions, which are headed "Board", "Stores", "Total Deductions", and lastly a column "Amount Due".

The item of "Board" is entered in the time-book for the special reason that if you were accounting for a man's labour at a figure per day, which does not include the cost of feeding the man, you are losing track of that cost. Even if the man has been actually hired at, say, $40.00 per month and board, you should in your time-book add, as wages, a sufficient amount to cover the cost of feeding him. Let us assume this at 50 cents per day, which, added to his net wages per day, may be considered as his gross wages. This gross amount will then be distributed proportionately as a charge to the various work done by him. The amount added for board is thereafter deducted from the total amount earned to obtain the net amount due. If an account is kept in the Cost Ledger on the cost of Living Expenses, the deduction for board is made as a credit to that account.

One very important item in obtaining the correct costs for work done is to keep time on the work done by yourself. This is not required, of course, in connection with cash payments, but that the service rendered by you shall be properly accounted for in finding out the cost of doing any particular work. Put yourself down at $75.00 per month, or if you think you are an extra good sort of a hustler in keeping things going, make it $100.00, but at all events keep track of the value of your own services as part of the cost of the several farm operations.

WORK STOCK.

The Work Stock used should be carried in the time-book in the same manner as for the time of a man. The charge is made to the Account Number representing the particular operation of work for which the horse is used. A fixed amount per day should be charged to cover the estimated cost for feed and care of the horse, say 50 cents per day. This estimated cost is then distributed over the work as the labour of each horse is accounted for.

In the Cost Ledger an account should be kept dealing with the expenses of the barn or corral, to which you charge feed, labour, etc., that are necessary for the care of the horses, and by keeping track of the horses cared for the actual cost per horse per day can be obtained each month.

If a horse is idle the time for that day can be charged to an Account Number designating "Idle Time" under a heading dealing with General Maintenance of the Farm.

MISCELLANEOUS CHARGES.

There are a number of miscellaneous charges taken care of by the Cost Ledger. One of these is the General Maintenance of the farm, which I have just mentioned in the foregoing. This account is one that is used to charge all such items as Idle Time, Taxes, Miscellaneous Supplies and Labour, and a number of other items that are incidental to the farm as a whole but not to any specific farm operation. This account, General Maintenance, can be apportioned to the specific farm operations at the end of the year.

DEPRECIATION.

It is observed in the list of Account Numbers given the item "Depreciation". This item should appear as a charge to every farm operation on which equipment is used. In the General Ledger there is an account of "Equipment" to which has been charged every purchase of tools or machinery. Equipment naturally becomes of less and less value as the articles are used or lost. At the end of the year, before making the final entries, a new valuation should be taken of the equipment on hand, and the difference between the value determined at that time and the original purchase price ascertained. This difference in value is credited as "Depreciation" to the "Equipment Account", and this amount, as near as you can approximate, is then apportioned as a charge to the Account Numbers representing the work on which the equipment was used.

INVENTORIES.

At the beginning of each year, a physical inventory is taken of equipment, livestock, farm produce, and in fact all things that are a part of the farm assets. The value of many of these articles must be estimated, and the total value is entered up as a charge against an Inventory Account. For example, as Produce may be used in connection with the farm work, the Inventory of Produce, say Hay or Grain, is credited and a debit entry is made in the Cost Ledger against the cost of the Corral. These inventories are checked up from time to time, so that any large errors may be adjusted. It is one of the most essential things in keeping correct costs of work, or in fact accounting for your business generally, that you know what assets you may have on hand from time to time and what is done with them.

The foregoing description, as related to cost-keeping, while necessarily somewhat long, is not as difficult of handling as it may appear. For the purpose of obtaining cost of work the following would be necessary:—

A Voucher Record, on which to keep a memorandum of your business transactions as they occur from day to day; a Time-book, ruled as described; Cost Ledger Sheets, ruled in a manner so that the cost of work month by month and totals to date may be entered, and the Classification Sheets so that you

may keep, as a permanent record and for reference, the charges as they are taken from the Voucher Record and are added up for a total to enter into the Cost Ledger. These will supply all necessary information to obtain costs of any or all operations required on a farm. From the costs obtained in comparison with areas, crop yields, etc, the relative unit cost of any labour operation or other information may be worked out.

Every farmer should in addition, however, know what he may owe, or what is owing to him, for goods bought and sold, and a record of such transactions should be kept in a Personal Ledger. The entries can be made when the time is convenient for doing so if you have kept in the Voucher Record these transactions as they have occurred. A part of the Personal Ledger may be used to keep such General Ledger Accounts as Stores Account or Inventories of Farm Produce, or other things that cannot for a time be directly charged to some particular work accounted for in the Cost Ledger.

To large concerns having a book-keeper and to anyone familiar with book-keeping the use of the Voucher Record makes all Ledger Accounts, and the relation of the cost-keeping records to the ledger accounts apparent. Where books for large concerns are closed at the end of the year, the Cost Ledger Accounts for any operation are written off as a debit to Revenue Accounts in the General Ledger, which deal with the returns from the farm.

MR. PORTER: I have been impressed with the matter of keeping records. It seems to me that a man should not run a business and not know what part of his operations are paying or losing. We are making mistakes and it is the wise man who profits by the mistakes he makes and changes his methods by not making the same mistake over and over.

You often see men in business who make no effort to keep a record of what they do in a financial way and they will continue the same line of operations and lose money on it year after year. They may come out on the proper side of the account at the end of the year in the total, but any loss they have they are making up by an extra profit on something else. If they would follow some system of cost-keeping and know which is losing and eliminate the cost of keeping it, they would not go on. It is the same with cows that you find are not making a good record, you dispose of them. On the farm a boy or girl who had business training in any way should have a knowledge of keeping accounts.

I trust that the able manner in which Mr. Hays has gone into this matter will benefit those who have heard it and I hope they will not say it is too complicated. I hope they will try to start a system of cost-accounting and get the idea of the importance of it, and if they will keep the voucher record and show the money they spend and how much they receive, then the boy or girl can very readily be trained to work up the other accounts and items themselves and show how much has been gained or lost on any transaction.

The older farmers will say that they have not time to keep books. It is too much trouble to fuss with them. I lived on a farm for twenty-two years

and I know what it is. It only takes a few minutes to put down what you have to keep record of and the rest may be worked up at a later time. If you do not want to go into an elaborate system take it to a book-keeper, start some sort of record or get the boy or girl in the family available to do it. I think you will find it to be a very valuable investment of the time they are taking and will prove one of the most profitable things they can undertake.

MR. BARK: Mr. Chairman, I too, believe a good deal in the sentiments expressed by the former speaker and I want to say that this is one of the most complete sets that could be used and is well adapted for the keeping of those things. I believe the farmers should keep track and know whether it is profitable to keep hogs and feed them and whether it is profitable to keep dairy cows, or whether it is profitable to raise alfalfa or whether they are losing money on grain.

I have spent a good deal of my time on the farm and I do not yet see how farmers, farming as I have had to farm, would have the time or inclination to keep such a set of books that would keep them up to date. I know how as a kid back East on the farm, after having milked seven or eight cows and having fed the hogs and pigs, I would sneak up the back hall with a lantern to the bedroom at ten o'clock at night as tired as a dog, and that happened every day, and there was plenty of time on the Sundays to mend the harness and I did not get time, and Dad did not get time to keep books, and we never knew whether it paid to keep a cow or calf or whether we should knock him on the head.

As I said before, it is the most complete and the best set I ever saw and I feel it is a necessity for farmers to keep a system like that, yet I think there is a missing link somewhere—the time to keep it or a simpler system, or just go without keeping it will do. I remember how tired I was when I sneaked up there and Dad would call me long before I knew it was time to get up. Don't take me for a moment as deprecating the value of that set of books, because I would not do it for the world.

MR. HAYS: This system may appear complicated, but for any man who is handling 160 acres of land and using the usual number of men on his farm, I will keep all those records on his farm in ten minutes a day. He can by the expenditure of that much time in the evening and in half a day's time in one day in the month work up this sheet here and by those figures find out whether he is losing money or making his best profits, and therefore increase his profits during the following year. Is that not much more worth while than going out to milk an old rip of a cow that does not give enough milk to pay for her keep?

MR. LAWRENCE: I never was the man that would start work before daylight and work up to ten o'clock at night as Mr. Bark says. I would not care to do it. I have frequently written up to twelve o'clock, but still that is not milking cows. It is not that kind of manual labour. This is what I want

to say. There was an old Devonshire farmer that I knew in my younger days, and a Devonshire man and a Scotchman are both about on the same level. They look not after the dollars and cents, because we have not got them at home, but they look after half-pennies and farthings and see that they do not get on the floor or in the chinks. This farmer of an evening would have his boys who had left school, come in and sit down and report to him what he did not know in regard to the work of the men on the farm. I used to enjoy the fun when I was staying there. This was his system: the farm had a number of fields. He was farming, I suppose 1400 acres and begrudging the very ground that the fences stood upon—cultivating right up to the fences. You could not open the gates the full width for fear of knocking the crop down. It was all mapped out. Every field was known either by name or number. There was at least ten teams at work on the farm and as many carters and a boy with each carter. Each boy had to show where every man had been working on that farm; whether it was on this field or that and what he had been doing and that was all put down to the account of that particular field, so it went on right from seeding to harvesting, each at a certain time, whenever it was. The cost of the farm was worked up in that way. There was so much a day for a horse and so much a day for a man, so much a day for a boy and that was all put against the field they had been working in. I would like to ask Mr. Hays whether his system of accounting takes in things in that way so that you could see how much the cultivation of the twenty acre field cost at the end of the year and be able to see exactly the expenditure in detail and in the gross.

MR. HAYS: I tried to cover that ground here. I said in the first place, you are dealing with a certain particular feature. Suppose it is oats you want to know what the cost of operations will amount to. You can divide that up to any number of operations. You can make it ten or two or a hundred, but divide it up to some particular expenditure that you can classify. Do not try to sub-divide it into such a fine point that you cannot classify. Keep track of seeding, ploughing, harvesting, stacking, threshing, etc., and you can add to them or change them, but each one of these classifications is represented by the account number to be fixed in your mind. Say that you will classify under 40 and so on. You have a man working on field named H. Jackson. He is out there ploughing. He ploughs say, on the first and second. You would put in this column right here, the figure 40 and a cross there showing those days and so on. Then the next day, he may be hauling fertilizer or anything and it is charged up to 41. You keep track of the man's time as you would in a time book. I venture to say that a man hiring men keeps a time book and he places down first the number of the operation that man was on, on that day, and then at the end of the month he finds he worked so many days on account number 40 and so many on 41 and you put it on that sheet there.

MR. JOHNSTONE: As my friend has referred to my nationality, I might say I always like to make money and I always want to know what it costs. I

agree with the whole system of book-keeping. I tried to keep books and keep track of the details, but I found I was losing money. In actual practice, I found I had everything I wanted. The reason I did that was that I put so much down for my time and for many years I had been doing it and so many months a year I was spending to see if I could not interest fruit growers and to see if I could not buy bran and shorts direct from the farmer and I put my time on that and found I was losing money. When you come down to the details and find you are losing money, if you are a Scotchman I advise you not to do it. If you are going to keep a system of book-keeping that will show you losing money, don't do it.

MR. STOCKTON: I have used the account number system that Mr. Hays has explained, and I want to make a suggestion for some who think it too elaborate. Many farmers do not even keep a time book, but the basis of that system is the time book and the farmer can go quite a ways in keeping cost. If he would keep an inventory once a year of his equipment and stock and a pass book in which he shows the money he has expended for material or supplies, and the money he has received and makes his cost record in this time book, he could do it without changing Mr. Hays' system except in one respect. Instead of using the account number and having additional books, to have the time book a double page one with space sufficiently large so that you could write in whether the man is ploughing or seeding or what field he is working in. In that way, the time book will contain the basic record from which he can make up most of the cost he might particularly need or be interested in. That is just a suggestion for some one who thinks the system is a little beyond him in elaborateness or time that might be occupied in keeping it.

MR. LAWRENCE: Is any provision made for keeping stock and gain at the end of the year?

MR. HAYS: I stated, at the beginning of the year a person should take an inventory of every farm asset. Take dealing in horses; he has a certain valuation for his horses and charges up to the inventory account for horses that valuation. If he sells some, it is credited. Naturally the same thing applies to steers you might buy and all sorts of things usually on a farm, but not used right away. Simply put them in stores as it were and hold yourself accountable for what is taken out of that and charge it to whatever the equipment went to. It is very important, I am sure, that every person should take an inventory of what he has, otherwise he has no idea of what he is doing. His bank account might look good, but if he was to take stock at home he might find himself very low or vice versa. He would not be able to tell what the profit or loss in any feature was unless he knew what he had on hand at the beginning of the year and what he had sold or lost. Every transaction is on that one sheet just day by day as he goes on. He does not have to do anything but enter that up and I am sure that a man handling men would keep a time book. If

they will mark simply what they are doing and bear in mind that a number simply represents that particular work he will have no trouble in keeping the account.

MR. FREYBERGER: I would like to ask Mr. Hays whether or not it is possible to buy a set of books or what he would charge to make a set of them and what he would charge for half a day's instruction. I hardly agree with Mr. Hays that the average farmer is very negligent in keeping accounts. As a matter of fact if farming was not such a paying business, most of us would fail, but the fact is that it pays so well we can have many losses and yet come out on top. Most of us have sense enough to keep some books, but the trouble is that we do not want to. We are tired, of course, but we are not too tired to go out and carry a bucket of slop to the pigs or shut a door or gate that we happen to forget and left undone, if it is going to pay us and I for my part would like to keep the set of books. I do not know that I care to learn how to do it. I have got some boys I would like to learn to do it. I would like Mr. Hays if possible to teach them if he has got time.

CHAIRMAN: The report of the proceedings of this Convention will be printed and I was going to ask Mr. Hays if he would have it prepared in such a form that it could be published and that would perhaps meet with the wishes of this gentleman.

MR. HAYS: Attached to these typewritten sheets will be some sheets showing what you want. There is no place you can buy these sheets because we make them up for ourselves here. They are taken from sheets used in the States and from knowledge I have gathered dealing with them for over eight years. I might say too that the organization for which I am working has expended over one million dollars and over 50 per cent of this has been kept track of by this system and there are thousand and thousands of dollars that have been dealt with and there is no other system that I know of, and I have looked into the matter for some fifteen years, that gives you the cost of any one operation that may come up.

As to teaching you or spending half a day with you. In the first place, I am not an accountant, neither am I a farmer. My business is an engineer and I was asked to present this paper to you in the first place, and I found it most difficult to put it into shape for people who are not book-keepers and do not possibly understand the meaning of credit or debit, but I will be glad indeed to show Mr. Freyberger or any one else who is interested in this matter and I will be glad to devote what time I possibly can to it and also to supplying them with sheets for this system. I have had experience in introducing this system to scores of men in years past and any one with a common knowledge of arithmetic can get it very quickly and I will guarantee it will only take ten minutes to enter up this record in a day and that record will cover all your transactions and at the end of the month you can clean up the whole thing in four or five hours, but that does not include keeping the inventory. It only covers the cost.

CHAIRMAN: This closes the evening session. The Convention is adjourned to to-morrow morning at 9.30 a.m.

THURSDAY—MORNING SESSION—NOVEMBER 25TH, 1915

MR. WILLIAM PEARCE, in the Chair.

MR. LAWRENCE: Reads the following resolutions which have been before the Resolution Committee:

Moved by William Pearce,
Seconded by C. E. Lawrence,

WHEREAS an accurate knowledge of the location, quality and quantity of water supply available is the basis of irrigation development, and;

WHEREAS the matter of topographic and hydrometric surveys to determine the location and quantity of such water supply and the proper methods of conserving it must be undertaken by the Government administering the law relating to the use of such water, and;

WHEREAS it is understood that the Governments conterned find it necessary to curtail expenses as much as possible, and;

WHEREAS it would be a great misfortune if the work already started should be interrupted, as records missed cannot be recovered;

THEREFORE be it resolved that this Convention urges strongly upon the Dominion Government, and the Government of the province of British Columbia, the importance of making the necessary appropriation and providing the necessary staff to continue, without interruption the work of gauging all streams of water supply.

Carried Unanimously.
Moved by E. A. Howes,
Seconded by H. B. Muckleston.

WHEREAS it has been of benefit to this Association to have first hand reports for our own annual report to our delegates of other Irrigation Congresses, and

WHEREAS it enables this Association to report on and invite to take part in our own convention, speakers from across the line,

THEREFORE be it resolved that this Association authorizes its Executive so far as financial conditions will permit, to send one or more delegates to the Oregon Irrigation Congress at Portland in January or February, and to the International Irrigation Congress in the United States, wherever it may this year be held.

Carried.

CHAIRMAN: I will now call upon Mr. F. H. Peters, Commissioner of Irrigation, Calgary, Alberta, to address you.

MR. PETERS: Mr. Chairman, Ladies and Gentlemen,—Always before when I have had the pleasure of addressing this Convention, I have spoken on some subject directly concerning the work under my charge which was being carried on by the Irrigation Branch of the Department of the Interior and so have been able to speak with some assurance.

This time when your Secretary was kind enough to ask me to give an address, I felt that these fields had been pretty well covered and so I determined to speak on the subject chosen that is:

"THE VALUE OF THE WESTERN CANADA IRRIGATION ASSOCIATION TO THE FARMER"

This means speaking on a matter of opinion and not of fact, so that I am not able to speak with the same degree of assurance as formerly. The subject is one that I have been thinking about for a considerable time and I trust that you may find it of interest; if you do not, I will, in any case, be very glad to have had this opportunity of giving expression to my feelings for the purpose of getting the matter on record and in the hope that it may do some good.

The questions to be answered are—

Why is the Western Canada Irrigation Association in existence?

What are its objects?

How are we trying to gain these objects?

What is the value of the Association to the Farmer?

The last point "What is the value to the Farmer" is the one that I am really trying to get at and analyze, because I believe that basically the Association is for the benefit of the farmer, that it does benefit the farmer, and that in the past the farmers have not taken as much interest as they should in the Association. My feeling is that if I can make any of you see eye to eye with me in this matter then you would take more interest, which I think would be a very good thing. I would explain here that I mean these remarks regarding the interest which is taken by the farmers to apply mainly to Alberta and Saskatchewan, because in British Columbia the actual farmers have shown a greater interest in the Conventions and have given them more support.

That this Association has been of great benefit to the farmer must be clear to anyone who will read over the reports of the previous Conventions held, and if any person in the audience doubts this statement I would suggest that he obtain these old reports and go through them and after this I feel quite satisfied that he will agree with me.

I have quite recently read these reports and while I cannot say that this is the only cause for carrying them out, I found that nearly all the work for aiding irrigation undertaken by the Dominion Government has been previous-

ly considered and urged upon the Government by this Association. I would mention as some of these, the proper carrying out of the stream measurements and irrigation surveys, the creation of the Forest Reserves to protect the sources of water supply, and the establishment of demonstration farms, while in-so-far as the Provincial Government is concerned, considerable discussion and strong resolutions were passed concerning the agricultural schools which have since been established and proved to be so very successful. These questions are very big ones and are of great importance. What I have noticed in reading through the reports particularly is the lack of discussion by the actual farmers and noticeably the lack of discussion of detailed methods of farming, that is to say such questions as just how to apply the water and when to apply it, etc.

Now as regards the reason why this Association is in existence, I turn to the Constitution of the Association and find the objects set forth as follows under Article III.

"The objects of the Association shall be: (1) To promote and diffuse knowledge concerning irrigation and other uses of water throughout Western Canada; (2) To facilitate conference and deliberation among the people of the country concerning irrigation and related interests; and (3) To provide means for bringing the needs of the people and the country before the Provincial and Dominion Governments."

As regards object (1),—To promote and diffuse knowledge concerning irrigation and other uses of water throughout Western Canada,—looking back at our reports of previous meetings which I have not attended and consulting my recollection of those which I have attended, I find that the great bulk of papers and discussions have come from men who are entirely, if I might use the term, in the business end of the work, that is to say civil engineers, operators and professional agriculturists. It is quite proper and necessary that these men should speak at the Conventions, but we should have more papers and particularly more discussion from the actual irrigators as to what the little difficulties are that they encounter in the field in carrying out the suggestions which are usually given by the class of men above referred to. There is no question about our wanting and welcoming all the professional men at these meetings, but I think that these meetings are pre-eminently the places for the professors and the farmers to swop ideas, and as I have indicated above, the professors, up to date, seem to have had a pretty complete monopoly on all the talks.

As regards object (2),—To facilitate conference and deliberation among the people of the country concerning irrigation and related interests,—here we have it point-blank—To facilitate conference and deliberation among the *people,* and I presume that I might properly substitute the word "farmer" in the place of "people" and still give the true sense that was meant to be expressed in this sentence. Some day I presume the Western Canada Irrigation Association will be the "Mother" organization of many smaller and probably more directly farmers' organizations, and then all the little questions of details that the farmers are so interested in will be discussed in these smaller organizations and the Conventions of the Western Canada Irrigation Associa-

tion will properly be the place for discussing the bigger questions and things that have been previously boiled down by the other organizations. But at the present time we have not got that far and we have plenty of time at our Conventions to give all the space necessary to the farmers so that we can well afford the time, and I think it is highly desirable that these detail questions should be discussed at our meetings. Then I think, that our publications will be of far greater interest to the farmers, and the greater the interest to the farmer the greater their value.

As regards object (3),—To provide means for bringing the needs of the people and the country before the Provincial and Dominion Governments,—In taking up any question before any organization of this kind it is always necessary to bear in mind two things,—First of all the question has to be thrashed out and a definte decision arrived at as to what is the best way of overcoming the difficulty which is being discussed, and then after that there must be some strong organization who will follow up the resolution, and see that the matter is forcibly brought to the attention of the people who are in a position to take the necessary action. As I have previously indicated, when we have a number of smaller farmers' organizations then the work of the Western Canada Irrigation Association will be to take up the resolutions passed by the smaller meetings, sift them out and if necessary combine them and then provide sufficient weight so that the matters will be given the attention and consideration that is due them.

How are we trying to gain these objects? The answer to this question, in general, is very obvious—By holding meetings such as this one and getting papers and addresses from different persons. But to go into a little closer detail, I would point out that in meetings such as this you will always find some certain questions or set of questions that are uppermost in the papers and discussions. In the earlier days of this organization everybody was primarily interested in getting their irrigation schemes built. Now we have a different stage in our development. The most of the schemes are built and we have come to the more difficult question of practical operation and dealing with the actual problems that arise in the field—that is the farmers' problems.

I think I may safely say that during the past year your Executive have felt that the big problems of the day are farmers' problems, and that for this reason we should get more farmers to attend our meetings and get more talks from the farmers who do attend, and I am quite sure that the main point in arranging for this meeting has been this special endeavour to interest the farmers and get them to attend.

In giving this question the great consideration that it received, two points were uppermost,—First, that the time of the Convention must be made to suit the farmers and that something must be done to make the meeting as interesting as possible. Your Executive has made a very decided change from all previous meetings and held the meeting at this late time in the season thinking that this would make it easier for the farmers to come in, because

it was a time when their thrashing operations would probably be far enough advanced so that they would have time to get away from the farm, and towards developing interests we have got a number of papers which should be of very direct interest to the farmers, and in addition have arranged for the little exhibition of irrigated farm products.

I would like to say here as a member of your Executive, that we have given this matter a great deal of thought and we would welcome the opinion of any of the delegates as to whether the idea particularly regarding the date of the Convention, is a good one or not, so that we may have the benefit of this advice in arranging for the next Alberta meeting.

Now to diverge for a moment and say a few words about other similar organizations and what they are doing: The Cypress Hills Water Users' Association is a young organization and its members, who are practically all farmers, are scattered over a wide territory and are hard to get together, but last winter this organization held a meeting in Maple Creek which resulted in getting a number of excellent papers and some very interesting talks from the farmers themselves. I might also say that this meeting was the means of bringing together with the farmers their Member of the Provincial Parliament and the Minister of Agriculture of their province, and gave them an excellent opportunity of talking over matters of mutual interest with these men.

As a representative of this Association I have attended two meetings of the Oregon Water Users' Association held in Portland, and this Association is to my mind an excellent example of what good can be done by associations of this kind when the proper interest is taken by the members. The hall in which the meetings were held both times, holds I think, about two hundred, and it was always difficult to get a seat, and most of the time there were a good many of the men standing up. The meeting was 90 per cent composed of actual farmers and they were all ready to get up and give their opinions on questions with which they were familiar. The Board of Trade of Portland recognizes the value of a meeting of this kind to their city and places the organization that they have at the disposal of the Association in arranging their entertainment, etc., and on both occasions that I have been present, arranged for a splendid banquet to all the delegates.

And this brings me to a point that I mentioned last winter at Maple Creek before the Cypress Hills Water Users' Association, and that I am going to mention again here. I think if the irrigation farmers would get together more through the medium of this Association, that this would go a long way towards commanding the attention that they deserve from the local boards and other similar organizations. True in Oregon irrigation is better established and some years ahead of us in its development, but there the Portland Board of Trade co-operates most fully with the Irrigators' Association, helps to arrange the meetings, because they feel it is a good thing for the city, and always gives the banquet that I referred to previously, because they feel they owe it to the business men in their city to bring them in touch with the irrigation farmers. They openly say that Portland lives on its surrounding

country, and that Portland is always glad to help the farmers in any way to make an extra dollar, because they are sure that they will always get a part of it in the city.

In Lethbridge also irrigation is better established than it is in this district east of Calgary, but there the President of the Board of Trade has given a great deal of his time during the last two years to studying irrigation problems, and as he is still on the job and going strong I presume that his efforts in this direction are recognized and appreciated by the people of Lethbridge. Calgary some day will boast of being the city that has tributary to it the greatest irrigation projects in America, but to-day they seem to have no interest in the matter, and certainly do not give any help. As regards the Board of Trade of Calgary being interested in irrigation, I may say that since I have lived in Calgary from 1911, I do not recollect ever seeing in any of the newspapers that the Board of Trade was discussing any problem connected with irrigation. The irrigation farmers perhaps are to blame for not jogging their memory in this respect.

The town of Bassano is I think, to be commended because of the great interest that they have taken and the help that they have given in arranging for this successful meeting we are having, and I also have pleasant recollections of going out just before harvest, I think a year ago, on a motor trip through the Bassano colony which was arranged by one of the organizations here, in order to show its members the results of irrigation farming.

I have found this is a hard subject to talk on and perhaps I have not made myself very clear. I trust, however, that you have at least got an idea of what I was driving at, and trust also that you will give some little thought to the points that I have raised. I would say this with great emphasis. Your Executive wants to interest the farmers and particularly to get discussions in these meetings that will interest them. We always try to get speakers who we think will be of the most interest to our farmers here, but as the old adage goes, two heads are better than one, and I am sure that if at any time any of you will send in suggestions to our secretary as to certain speakers that you would like to hear, or suggest certain lines on which to have us arrange for speakers, he will always do his best to carry out your suggestions.

And now to finish, I would like this little talk to do some good and I know that this cannot be unless you understand the spirit in which it is given. I have not meant to criticise the farmers in any way, but rather have tried to point things out as a friend in order to try and help. But anyone who trys to give advice to someone else by criticising is always liable to start trouble, and therefore I realize that while I have perhaps suggested that the farmers are bad talkers, perhaps some of the audience feel inclined to say, "Yes, but you would be a mighty poor farmer." If they did I would say, "Yes, I realize that and want your co-operation—Will you give it?" This is really what I am asking for—fuller co-operation from the farmers. I know that with my fellow engineers and administrators we are often classed as men who can only sit in swivel chairs and think, but if this is true I want to tell you that we do some

tall thinking, and I believe that if the farmers will co-operate with us, our thinking can save their backs many a tired ache. (Applause)

CHAIRMAN: The Secretary has asked me to announce that he desires to have further certificates in order to get the Convention rate.

MR. ABBOTT: I realize very much the position the average farmer is in when he comes from a visit amongst friends and we cannot expect them to get up and say very much on these questions until they have gone into little meetings of their own at home. The first step that a farmer wants to take is to get three or four men together in their own little school house and thresh out there whatever is on their minds, so as to prepare them to go to a larger meeting where there are three or four school houses meeting together and then pick the man to come here. Until our farmers make more organizations and get them started, we will not be able to get them started to face meetings like this.

SENATOR BOSTOCK: There is no doubt that the farmers as a rule do not possibly enter into discussions as much as we would wish them to do. I take exception to what Mr. Peters said that farmers should be readers of papers, because I think the farmer's duty is to his work and to be producing and bring his farm up to the best standard of production. My experience is that if he is doing that he has all the work he can do in the year and would have very very little time to get up papers for meetings like this.

I think we as farmers look to Mr. Peters and gentlemen like him in a professional way to make up these papers and come in contact with the farmers to understand their side of the question. We think Mr. Peters and others in his position have more time on their hands to go into these subjects and prepare these papers and they ought to look to the farmers to carry on the discussion after the papers are read and brought before the meeting.

The last gentleman has said until the farmers get better organization they will not be in a position to take hold of matters as we would wish to see them. I think what we all want to-day is better organization amongst them and a better realization of the fact that by good organizations they are going to accomplish what they desire to do and get better results than they have in the past. I think Mr. Peters is to be congratulated for what he has brought before us.

MR. LAWRENCE: Mr. Chairman, Ladies and Gentlemen,—I would like to assure Mr. Peters that what he spoke of in the conclusion of his speech with regard to anything he might say being taken as a sort of adverse criticism, is not the case and is not received as such by this meeting. Mr. Peters has put in a very practical way and in a very simple way, the objects of this Association and what he has said has been said so kindly, and so nicely, that we appreciate it in every way and shape. I can speak for myself and my fellow delegates in that respect. Not only on this occasion, but on other occasions too, he has treated us in this same spirit and we appreciate it very much.

Mr. Peters stated that the farmers in British Columbia were showing an interest that was quite evident. I am glad to have his statement of that on record and am glad to have it recognized by this Association.

It was also stated that, there should be farmers' organizations who should discuss these subjects before coming to this Convention. In our district that is exactly what we do. We have got several farmers' institutes in the district. We have three agricultural associations. We have a live stock association; we have a water users' community, the first that was formed under the new Water Act of British Columbia. We are holding very frequent meetings and the things that have been brought up at this Convention have been discussed, some of them on several occasions, and we find that instead of hanging back and having difficulty in getting members to the meeting, it is no uncommon sight on our usual Thursday afternoon meeting days, to see eight and sometimes ten rigs with teams to each, coming down the hill, six, eight, ten and twelve miles to attend that meeting. Perhaps it is a water users' meeting in the afternoon and in the forenoon a farmers' institute meeting. Sandwiched in between will be a live stock meeting. We find time for it and the interest in those meetings is very marked and most of us are waiting for the next Thursday in the next month for the next series of meetings. If there are any gentlemen here who find difficulty in getting to work in that fashion, all I can say is if only two of you will agree about it, go to work to get a third and then with determination get four or eight and you can soon have a meeting of from fifteen to thirty farmers full of the subject you want to discuss.

For eleven years I have been working to get an organization in proper form. It is perhaps a long time to wait but we are now getting the benefit of it. Once the result is achieved, I can assure you that it is well worth working for. To come and hear what Mr. Peters has to say as a government official and for him to give us his advice and to show us that the work we are doing like this, gives us the element of government backing, so that we can put these things into effect. That is the object. You may find a great many difficulties and rebuffs, but work for that end and I can assure you that the result is well worth working for.

In regard to schools— I am sure that Mr. Peters will be glad to know that since Professor Elliott at Lethbridge explained what is being done for schools in Alberta, how they were training the boys and the girls, two years have passed now and the experience has been as we have heard at this Convention, very satisfactory. I stated at that Convention if any of the Executive of the Provincial Government of British Columbia had been present, it would have been a bad job for Alberta, because they would have carried Professor Elliott away with them to British Columbia and Alberta would have lost him. Instead of doing that or acting on those lines, the British Columbia Government has instituted a series or course of instruction for teachers first of all, and some two or three hundred teachers assembled this last year in Victoria and have gone through a course of instruction and a very severe examination. I brought an examination paper with me and have handed it to Mr.

Scott and he will no doubt show you how alive the Government is to this educational question. I am sure you will agree with me when you hear that paper read, that it is a pretty severe one, and although there are irrigators in our district who have been practising irrigation for forty years, who could not answer some of the questions on that paper. My daughter went through that course of instruction and I have read the paper and I said afterwards, "Do you mean to tell me you can answer those questions", and she said, "Yes, I have tried to", and I said, "You will soon be teaching your brother to plant potatoes". This is the more striking because the paper is on irrigation and I am glad that Mr. Scott is here to hear this, for it just shows that the Provincial Government of British Columbia is really waking up and showing a reason for its existence by what they are doing on this educational question. I am pleased indeed to say that on this subject they are just as far advanced as the province of Alberta, only while the province of Alberta has appointed experts to teach children in that way, the teachers first of all in British Columbia are being instructed so that they can impart the education to those under them. (Applause)

CHAIRMAN: I will now call upon Mr. William Young, Controller of Water Rights, Department of Lands, British Columbia, who will address us on "The Success of Water Users' Communities in British Columbia." (Applause)

MR. YOUNG: Mr. Chairman, Ladies and Gentlemen,—The remarks I have to make on the Water Users' Community and its success are of a general nature, touching on how legislation came about, some reference to the Statutes and a few words on what measure of success has attended the several communities that have already been organized.

On a former occasion I referred to the changes that from time to time were made in our water laws and which were necessary to permit of effective administration. It is not necessary at this time to again go over the ground other than briefly outline how the Water Users' Community legislation was adopted and the several forms of co-operation.

In speaking of the Water Users' Community legislation of British Columbia, reference must be made to the irrigation corporation. Those of you who are familiar with the proceedings of this Association will remember that the Irrigation Corporation was in a measure the direct outcome of a resolution of the Convention held at Kelowna, B. C., in 1912. The Irrigation Corporation Bill was accordingly prepared for the legislative session of 1913, but did not become law because it was pointed out that there were features that should be re-considered and for which the time was not available. The Bill accordingly stood over until the session of 1914. This not only gave ample time to re-draft it, but an irrigation season in which to administer under such amendments as had been made to the Water Act. The administration of water during that season (1913) revealed many defects, chief of these being the necessity for laws that would make possible the enforcement of beneficial

use and also provisions that would permit of co-operation in various other ways. These defects were remedied in the session of 1914 and so we have our particular laws on irrigation, the water-bailiff and under co-operation, we have the Irrigation Corporation, the Land and Water Company, the Mutual Water Company and the Water Users' Community.

The Irrigation Corporation many of you are already familiar with. The Land and Water Company provision replaces an imperfect law in respect of Irrigation Companies. Under this law it is no longer possible for the land promoters to incorporate first as a land company and then as a water company. They must now in their procedure outline a plan for the organization of a company for the benefit of the prospective purchasers of the subdivided lands to be known as the Settlers' Association and must further set out the proposed form and terms of the water clauses to be incorporated in all contracts for the sale of their lands. The Mutual Water Company provides that owners of land who are water licensees may organize a company with particular powers which will permit of the construction of joint works for conveying purposes. The Water Users' Community simply provides for a partnership of licensees in the construction, maintenance or operation of works and since this is the subject before us, we will accordingly proceed with it.

We look upon "The Water Users' Community" as being of basic importance for the reason that where, as yet in places the settlements comprise but a few farms, it permits of inexpensive but safe organization that later on may develop into one of the larger organizations mentioned. The law has supplied a long felt need that was promptly taken advantage of in several valleys.

The feature that is new about the Water Users' Community is the fact that by following the instructions as set out in the Water Act the members can avoid being individually responsible for all the acts of the Community. It was at one time possible for several licensees to co-operate under the "Partnership Act" as a "limited partnership". In this form of partnership, however, only the liability of the "special partners" is limited, the "general partners" being jointly liable for all debts and obligations of the firm, and severally liable for certain acts. Now even though it was possible by means of this Act and a series of agreements to co-operate with limited liability, it meant a procedure not only expensive and complicated, but most uncertain. No attempts were therefore made to organize until co-partnership was fitted into the Water Act under the title of the "Water Users' Community".

For the information of those who are particularly interested in this legislation, I have here the several sections that outline the procedure, and unless you wish to hear these read, I will refer to the different points.

Section 160 of Part VII of the Water Act, B. C., Statutes, 1914.

WATER USERS' COMMUNITY

Co-Operative partnership.

"160. (1) When two or more licensees desire to join together in constructing, maintaining or operating works under this section, and when the lands to which their licenses are appurtenant do not exceed in the aggregate two thousand acres, they may form a partnership under this Act, to be known by the firm name of "The (naming it) Water Users' Community," upon subscribing and filing with the Water Recorder of "the district" articles of partnership.

From year to year

(2) Such community shall, unless otherwise agreed upon, be deemed a yearly partnership renewable from year to year by tacit consent.

Vote by interest

(3) A partner in any such community, or his agent authorized in writing, shall at any meeting thereof be entitled to vote upon the interest which the partner may hold therein, but the result of the votes shall be determined by the number of interests voted upon and not by the number of partners voting at such meeting.

Interest according to license.

(4) The interest which each partner shall have in such community shall be based on the maximum quantity of water which he has the right to divert under his license.

Majority in interest may act.

(5) A majority of votes may decide upon the method in which the works shall be constructed and maintained and what repairs or renewals shall be effected, and may levy assessments therefor respectively and for the expenses of such community, and may determine the extent and manner of levying the said assessments and which the same shall be payable. Such majority shall also choose a manager who shall represent such community, who may sue and be sued in the name of such community for assessments and otherwise and he shall have the power to bind such community with his contracts.

When assessments payable.

(6) All such assessments shall be payable before the first day of June in each year.

(7) Any partner making default in payment of any assessment after receiving a notice from the manager certifying the amount due by him shall, if such amount be correct, be personally liable therefor to such community, and may be sued therefor in any Court of competent jurisdiction.

No enlargement of rights.

(8) No agreement or undertaking pursuant to this section shall enlarge as to quantity the rights of any licensee as fixed by the license.

LIMITED LIABILITY

Steps necessary to limit liability

(9) Any such community may limit the liability of its members upon complying with the following requirements, that is to say:

Upon filing with the Water Recorder a statement verified by statutory declarations, signed by each of the members of such community, giving the name of the community, the stream or streams from which water is diverted under the several licenses, a description of the license of each member of the apportionment of any license so held, the number and date of such license, and the land or mine to which such license or such apportionment thereof is appurtenant.

Effect of limited liability.

(10) After such conditions shall have been complied with, no member of such community shall be liable for any indebtedness incurred thereafter beyond an amount proportioned in his interest in the community.

Accounts to be kept.

(11) Every such community shall keep a correct account of its assets and liabilities, together with the names of the partners and the interest held by each, and shall make out a monthly balance-sheet showing the names of creditors and the amounts due to each, and file the same among the papers of the community; and such balance sheet and all the books of the community shall be open to the inspection of creditors at all reasonable hours.

When membership ceases.

(12) Any member of such community who transfers or disposes of the land or mine to which his license is appurtenant, or who abandons such license, or whose license is cancelled, and who has served a notice of such transfer, disposal, abandonment, or cancellation, as the case may be, upon the manager of such community, and filed a copy thereof in the office of the Water Recorder of "the district," shall cease to be a member of the community, but he shall in any event be liable for his proportion of any indebtedness of the community which may have been incurred prior to such transfer, disposal, abandonment, or cancellation.

Liability of member.

(13) Any creditor of such community, upon obtaining a judgment against such community, may register a certificate of such judgment to the extent of the proportionate liability of such member in the Land Registry Office of "the district" in which the land or mine is situate to which the license of such member is appurtenant.

Rights of creditor

Liability of community

(14) No such community shall be liable for any indebtedness than that contracted by its manager, or by its agent duly authorized in writing.

Penalty on failure to comply with Act.

(15) Should any such community fail to comply with any of the provisions of this Act relating exclusively to "limited liability"

communties, such community shall from the date of such failure cease to be a "limited liability community."

Whenever a Water Users' Community is contemplated attention is drawn to the sections in the Water Act in respect of irrigation and the Water Bailiff, as ultimate success largely, if not wholly, depends thereon. In fact, if we have had any measure of success in the administration of irrigation, it is quite as much due to these sections as anything, and although I have referred to them on a former occasion before this Association, it is essential that I refer to them again when speaking of the Water Users' Community. Since it will take up your time to read sections I will refer briefly to the several points.

Section 125 of Part VI of the
Water Act, B. C. Statutes, 1914.

IRRIGATION.

Quantity limited to beneficial use.

"125. The total quantity of water used under any license for "irrigation purposes" in any season shall be based upon the number of acres of the lands to which the license is appurtenant which are actually and beneficially irrigated, and the quantity used per acre shall be limited to such quantity as experience may from time to time indicate to be necessary for the production of crops in the exercise of good husbandry.

Rotation in use.

126. Having due regard to the priority of his right, a licensee under such license shall divert the quantity of water which may be necessary for his purpose, on being so directed by the Engineer, at intervals of time, under such system of rotation with other water-users on the same stream or otherwise, as may best meet the requirements of growing crops and at the same time secure an economical use of water.

Particular crop grown to be considered.

127. Notwithstanding the quantity mentioned in any license; such licensee shall be entitled from time to time to divert only such quantity of water (up to the maximum specified in the license) as may be necessary for the proper requirement of the particular crop grown from time to time upon the lands to which the license is appurtenant, and no more.

WATER BAILIFFS.

Minister may appoint

128. (1) Where licensees or other persons having the right to divert water from any stream cannot agree as to the distribution of such water or such part thereof to which they are severally entitled, the Minister may, on the recommendation of the Comptroller, appoint one or more Water Bailiffs, for such periods as he may

deem necessary, for such stream, or he may appoint one or more such Bailiffs for several streams or for any definite locality.

Duty and Power. (2) It shall be the duty of any such Water Bailiff, and he shall have the power, within the locality for which he is appointed, from time to time, and in accordance with the instructions of the Engineer, to divide the water of the streams or other sources of supply in the said locality among the works of the several licensees or other persons taking water therefrom, including the distribution of water among the various users of any partnership works according to the rights of each, and so as to prevent waste of water, and to shut and fasten or cause to be shut and fastened, and to regulate or cause to be regulated, the headgates or ditches, the controlling-works or reservoirs, or other diverting works as may be necessary by reason of the said rights.

Notice to be affixed. (3) Whenever in the performance of his duties any Water Bailiff regulates a headgate to a ditch or any controlling works, it shall be his duty to attach to such headgate or controlling-works a written notice, properly dated and signed, setting forth the fact that such headgate or controlling-works has been properly regulated and is wholly under his control, and such notice shall be notice to all parties interested in the division and distributon of the water of such ditch or reservoir.

Appeal (4) Any person who may be injured by the action of any Water Bailiff shall have the right to appeal to the Engineer, and the procedure of such appeal shall be as is provided for an appeal from an Engineer to the Comptroller.

Compensation. (5) The Water Bailiff shall receive such compensation as the Minister may determine.

By whom paid. (6) Such compensation shall be paid by the licensees and others entitled to divert water from any stream or locality where the services of such Water Bailiff are required in proportion to the quantity of water used respectively by such licensees or persons, or the quantity of water to which such licensees or persons, or the quantity of water to which such licensees or persons are respectively entitled, as the engineer may determine.

Method of collecting. (7) The amount to be so paid by each licensee or person shall be a charge upon the land to which the license is appurtenant, or, where the right to divert water is not held under a license, upon the land upon which the water is used, and may, in addition to all other remedies, be a debt due to the Crown recoverable by action at the suit of the Attorney General or any person authorized by him.

Further powers (8) In the performance of his duties any Water Bailiff shall have all the powers of a police constable under the "Police and Prisons Regulation Act."

Engineer may act.

(9) The Engineer shall, if appointed by the Minister for that purpose, perform the duties and have the powers of a Water Bailiff under this Division.

(10) The Water Bailiff shall be under the direct supervision of the Engineer of the water district within which the locality to which he is assigned is situate.

To the Water Users' Community these sections on irrigation are the basis of any system of rotation agreed upon. In perhaps the fewest words possible the very essentials of successful irrigation are brought home to each member. In respect of the section on the Water Bailiff it might be said that the powers conferred on him are too great. It, however, depends entirely on the man who should be selected as having qualifications that particularly fit him for the work.

I have described to you the provisions made in our laws for this form of co-operation. You, no doubt, will be interested to know if it works out as easily as it reads.

A prospective community if left to itself does not readily get together in agreement; different views are presented. The holder of the first record probably has been dragged through several of the courts in the defence of his water right and for a time has faced ruin. Being successful in his defence and having enjoyed some years of peace, he does not propose to be a party to anything that will jeopardize his rights. The holder of one of the later rights takes the stand that he is not always sure of a share of the water and since it is hard enough for him to get along he wants to be certain that in becoming a member of the Water Users' Community he is not taking upon himself a liability that may mean the loss of everything he has. The result is usually a request that the Comptroller attend one of their meetings, when an effort is made to explain the several points provided in the Act and then answer any questions. The first record holder is told that membership in the community will not affect the status of his rights. The holder of the last record has explained to him the limited liability provision. Administration is also carefully explained, reference being made to the laws on irrigation and the duties and powers of Water Bailiff, attention being directed to the fact that the Water Bailiff is under the direct supervision of the District Water Engineer. This is an important feature for should the partners fail to agree on a system of rotation in use of water, the engineer prepares the order and sets the dates.

Another point with the prospective community is whether or not it is necessary to employ a lawyer. Now the majority is usually not in favour of having the lawyer because of the expense and to meet their wishes the department prepared a form which comprises the Articles of Partnership. We have tried to make these articles as simple as possible that those interested may understand them.

WATER USERS' COMMUNITY

Articles of Partnership.

We, the undersigned, do hereby certify that we have entered into partnership under section 160 of the "Water Act, 1914", by the name of"The..... ..... Water Users' Community".

The interim manager of the said Water Users' Community is..... .....of.....B. C.

A brief description of the system which it is proposed to operate is as follows:.....

.....

.....

(If the said system involves any change in the existing works, the Community should apply through its manager to the Comptroller of Water Rights (under section 24 of the Act) for permission to make such change. Forms for this purpose can be secured from any Water Recorder or from the Comptroller.)

The particulars with respect to lands owned, irrigable acreage, license numbers, votes of each partner and other data are given in the appended form, which is incorporated herewith and forms part hereof.

The liability of each member is limited to the amount of his share in the community which is governed by the maximum quantity of water which he is entitled under his license to use such of his lands as are to be supplied with water from the system of this community.

The said partnership was formed by agreement of the undersigned on the.....day of.....191....and the term through which it is to continue is.....years.

....

....

....

STATUTORY DECLARATIONS

I, A. B., do solemnly declare that the signatures of..... .....and.....and..... ....and.....and..... affixed to the above declaration are the genuine signatures of the persons whose they purport to be.

And I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act".

Declared before me at .....this.....day of.....191.... .....

..... Signature of Declarant.

.....

Title of official.
(Justice of the Peace,
Commissioner, Government
Agent, or as the case may be).....
I, A. B., do solemnly declare, etc. etc. (same form as the above).

NOTE: If it is desired to limit the liability of each partner, the above form after being carefully filled in should be filed in duplicate with the local Water Recorder, who will transmit one copy thereof to the Comptroller.

FORM

PARTICULARS WITH RESPECT TO LAND OWNERS, ETC.

	Name of partners	1
	Post-office addresses of partners.	2
	Name of streams or streams from which water is diverted for lands to be served.	3
	Lots numbers of lands of each partner to be served with water and to which license is appurtenant.	4
	Number of each license or apportionment thereof.	5
	Date of each license or apportionment thereof.	6
	Area (in acres) of each of said lands to be irrigated from community system.	7
	Maximum quantity of water for each of said lands under license.	8
	Votes allowed each member.	9

FORM

The first district to take advantage of these provisions was Heffley Creek valley. It did not take the public spirited men of this valley long to come to a decision, in fact they were ready to go ahead before the law became effective

in the railway belt. Here it was realized that only by means of organization and co-operation would contention cease. So far as I know the Heffley Creek Water Users' community has been and is a success. It comprises about 20 farms which together have about 1000 acres under irrigation. As a result of all parties doing their share an excellent reservoir has been developed. The provisions in respect of irrigation and the Water Bailiff have demonstrated that order and reasonable system works to the advantage of every one. Several incidents that have happened show that the problems of conservation of water, alienation of water to another watershed, and the granting of new rights which are of vital interest to the valley are more fully appreciated and the secretary of the community is making it his business to see that these problems are properly considered by keeping in touch with the departmental officers. In the old days these same problems were the business of everyone, yet of no one in particular with the result that no united action was taken.

In another district a community has recently been organized. In this case, it was necessary that an agreement be entered into with two of the prior record-holders for the use of their ditch, for some reason or other the members at one time reasoned that the agreement should be first entered into, then the community formed. Finally they were advised to see a lawyer who confirmed the advice of the department. The difficulty in this instance is the agreement. The record-holders did not fully appreciate their status and the powers of administration under the Act. Under these powers the administrators take the stand that it is not in the public interest to permit construction of parallel ditches, even on Crown land, where one ditch will serve the same purpose. These record-holders have been given to understand clearly that they must fall in line, and that any system of rotation in use of water ordered will be enforced. At the same time they are assured that this will work no hardship since any order of rotation gives first rights their due consideration.

I might add that co-operation under the Water Users' Community is proving of some assistance to the administration. To illustrate this,—a short time ago a land owner in the Heffley Creek valley wrote enquiring if he could secure a water right on Heffley creek. He was advised to confer with the Heffley Water Users' Community. Their answer being favourable, he wrote accordingly, and which we confirmed by writing the secretary of the community. The result was that in due course a right was granted. Had this man applied in the days prior to the organization of the community, I have not the slightest doubt but that there would have been objections from all who already held rights. The applicant and the objectors would have employed lawyers. It would also have meant considerable investigation by the department before any decision could have been arrived at. All the expense, litigation and delay that these proceedings would mean are put to one side by the community itself in one brief letter to the comptroller. There is just this to say in conclusion, that if the Water Users' Community plan of co-operation is proving a benefit to those who have taken advantage of it, it is likewise

proving of assistance to the water administration of British Columbia in satisfactorily disposing in some cases of what have been contentious districts. (Applause)

MR. JOHNSTONE: Mr. Chairman, I would like to take up half a minute to express my pleasure of Mr. Young's work on behalf of irrigation in our district in British Columbia. (Applause)

MR. FAIRFIELD: The Committee on Credentials begs to report that there have been a total of 199 registered delegates. Of these there are 76 accredited delegates. We are quite sure that there were numbers that came here without credentials, but were entitled to them, but nevertheless they had to be guided by those who brought their credentials with them.

The names of the accredited and registered delegates are:

LIST OF DELEGATES ATTENDING WESTERN CANADA IRRIGATION CONVENTION, NOVEMBER 23RD, 24TH AND 25TH, 1915. BASSANO.

W. R. Abbott, Maple Creek, Sask.
Chas. Allen, Strathmore, Alberta.
Alfred Andersen, Carseland, Alberta.
C. H. Attwood, Domnion Water Service Branch, Ottawa, Ontario.
Don H. Bark, Canadian Pacific Railway, Strathmore, Alberta.
J. L. Brown, Kamloops, B.C.
Senator Bostock, Kamloops, B.C.
L. C. Bond, Bassano, Alberta.
H. O. Budin, Bassano, Alberta.
F. H. Berry, Bassano, Alberta.
Oliver Blue, Department of Agriculture, Edmonton, Alberta.
Wm. Bailey, Irrigation Branch, Dept. of the Interior, Ottawa, Ontario.
R. E. Bird, Bassano, Alberta.
David T. Bennett, Bassano, Alberta.
J. H. Brewer, Crowfoot, Alberta.
Lieut.-Gov. Brett, Edmonton, Alberta.
J. C. Buckley, Gleichen, Alberta.
P. Belisee, Bassano, Alberta.
F. K. Beach, Calgary, Alberta.
D. Braniff, Bear Creek, Alberta.
J. S. Barker, 82nd Battalion, Calgary, Alberta.
W. S. Brook, Bassano, Alberta.
W. A. Burton, Medicine Hat, Alberta.
A. T. Connolly, Bassano, Alberta.
H. C. P. Cresswell, Department of Natural Resources, Canadian Pacific Railway, Calgary, Alberta.

H. S. Cross, Bassano, Alberta.
J. Cormack, Strathmore, Alberta.
R. W. Comer, Gem, Alberta.
A. J. Culbertson, Bassano, Alberta.
H. A. Craig, Edmonton, Alberta.
J. Campbell, Calgary, Alberta.
Chas. A. Clark, Bassano, Alberta.
E. G. Calkins, Gleichen, Alberta.
F. W. Carpenter, Bassano, Alberta.
A. S. Dawson, Canadian Pacific Railway, Calgary, Alberta.
S. S. Dunham, Lethbridge, Alberta.
O. Daehler, Bassano, Alberta.
Capt. J. Domaille, Department of Agriculture, Regina, Saskatchewan.
J. E. Degnan, Calgary, Alberta.
Jas. C. Dobson, Kamloops, B.C.
J. S. Dennis, Canadian Pacific Railway, Calgary, Alberta.
C. L. Dodge, Strathmore, Alberta.
Jos. Dixon, Maple Creek, Saskatchewan.
Jas. Dougall, Winnipeg, Manitoba.
J. F. L. deRouville, Calgary, Alberta.
W. A. Dilley, Calgary, Alberta.
A. G. Denbigh, Medicine Hat, Alberta.
Max Enos, Montreal, P.Q.
C. C. Elliott, Brooks, Alberta.
R. P. Findley, Bassano, Alberta.
A. L. Freyberger, Gem, Alberta.
H. W. Ford, Bassano, Alberta.
R. V. Ferguson, Gem, Alberta.
F. H. Fairfield, Lethbridge, Alberta.
G. A. Forester, Nateby, Alberta.
B. D. Fessenden, Strathmore, Alberta.
L. Fletcher, Calgary, Alberta.
Mr. Fryer, Seed Office, Department of Interior, Calgary, Alberta.
W. L. Gilbert, Carseland, Alberta.
C. H. Giffin, Strathmore, Alberta.
Marjory M. Goldie, Olds Agricultural College, Olds, Alberta.
A. George, Bassano, Alberta.
J. Grant, Standard, Alberta.
E. Gray, Bassano, Alberta.
Emiel Griesbach, Bassano, Alberta.
Simeon Hansen, Southern Alberta Land Company, Ronalane, Alberta.
S. N. Houston, Canadian Society of Civil Engineers, Calgary, Alberta.
H. Hamilton, Bassano, Alberta.
G. H. Hutton, Superintendent Experimental Farm, Lacombe, Alberta.
Dean E. A. Howes, University of Alberta, Edmonton, Alberta.

W. Hatcher, Langdon, Alberta.
W. J. Hopkins, Strathmore, Alberta.
D. W. Hays, Medicine Hat, Alberta.
W. F. Hicks, A. R. & I. Co., Lethbridge, Alberta.
J. E. Hellowell, Gleichen, Alberta.
W. Huckvale, Medicine Hat, Alberta.
Wm. Hoople, Canadian Development Co., Calgary, Alberta.
G. El Hyde, Cluny Nurseries, Cluny, Alberta.
R. N. Hayden, Calgary, Alberta.
M. C. Hendry, B. A., Manitoba Hydrographic Survey, Winnipeg, Manitoba.
E. M. Hall, Bassano, Alberta.
H. H. Honens, Calgary, Alberta.
R. H. Hanna, 82nd Battalion, Calgary, Alberta.
J. F. Irwin, Lethbridge, Alberta.
T. H. Irvine, Gleichen, Alberta.
J. Ironside, Calgary, Alberta.
E. R. Jones, Brooks, Alberta.
P. J. Jennings, Canadian Society, Civil Engineers, Calgary, Alberta.
James Johnstone, Nelson, B.C.
Ald. D. B. Johnstone, Kamloops, B.C.
B. J. Kleat, Bassano, Alberta.
G. O. Kerr, Lethbridge, Alberta.
L. J. Kemp, Hutton, Alberta.
M. E. Lazeret, Bassano, Alberta.
C. E. Lawrence, Kamloops, B.C.
Hans Lausen, Carseland, Alberta.
George Lane, Calgary, Alberta.
E. Lyster, Gem, Alberta.
H. A. Locke, Gem, Alberta.
Chas. F. Langer, Winnington, Alberta.
J. D. Laughlin, Gem, Alberta.
M. R. F. Lloyd, Lethbridge, Alberta.
Hugh McKellar, Moosejaw, Saskatchewan.
W. D. McKay, Alderson, Alberta.
E. M. McCameron, 516, 22nd Ave., W., Calgary, Alberta.
E. McKee, Bassano, Alberta.
W. McMullan, Nightingale, Alberta.
E. H. McCaughtery, Bassano, Alberta.
N. W. N. McMillan, Gleichen, Alberta.
D. McBean, Gleichen, Alberta.
F. D. McNaughton, Brooks, Alberta.
W. B. McLean, Lethbridge, Alberta.
A. A. McGregor, Bassano, Alberta.
Allen McGregor, Southern Alberta Land Company, Ronalane, Alberta.

J. N. K. McAllister, Canadian Pacific Railway, Calgary, Alberta.
Miss M. Murchison, Bassano, Alberta.
A. P. Miller, Gem, Alberta.
Hon. Duncan Marshall, Minister of Agriculture, Olds, Alberta.
W. Mathews, Lethbridge, Alberta.
J. S. Mavor, Bassano, Alberta.
B. C. Milne, Lacombe, Alberta.
M. Macklenburg, Calgary, Alberta.
A. R. Maurer, Hussar, Alberta.
H. B. Muckleston, A. R. & I. Co., Calgary, Alberta.
L. A. Moore, Gleichen, Alberta.
G. A. Morrison, Calgary, Alberta.
G. R. Marnoch, Lethbridge, Alberta.
J. C. Nelsen, Carseland, Alberta.
Chas. Orleans, Gem, Alberta.
J. B. Oldfield, Lethbridge, Alberta.
A. K. Olive, Calgary, Alberta.
F. H. Peters, Commissioner of Irrigation, Department of the Interior, Calgary, Alberta.
Sam G. Porter, Irrigation Branch, Department of the Interior, Calgary, Alberta.
E. G. Padden, Bassano, Alberta.
C. O. F. Palmer, P.O. Box 129, Bassano, Alberta.
E. F. Purcell, Bassano, Alberta.
G. M. Pierce, Bassano, Alberta.
G. H. Patrick, Strathmore, Alberta.
Arthur Perrey, Cardston, Alberta.
Chas. Park, Pandora, Alberta.
H. W. Pattin, Bassano, Alberta.
C. W. M.. Peterson, Farm & Ranch Review, Calgary, Alberta.
R. B. Robson, Crowfoot, Alberta.
Axel C. D. Rath, Bassano, Alberta.
R. P Robinson, Crowfoot, Alberta.
J P. Royer, Gem, Alberta.
R. E. Robson, Gem, Alberta.
Edmund N. Ridley, Strathmore, Alberta.
Chas. Raley, Lethbridge, Alberta.
C. Rodbourn, Crowfoot, Alberta.
F. W. Rumble, Gem, Alberta.
J. W. Renton, Canadian Development Company, Calgary, Alberta.
S. P. Summerville, Amethyst, Alberta.
A. L. Sifton, Premier of Alberta, Edmonton, Alberta.
W. E. Scott, Deputy Minister of Agriculture, Department of the Interior, Victoria, B.C.
F. Maurice Smith, Penticton, B.C.

R. B. Stevens, Langdon, Alberta.
P. W. Stone, Bassano, Alberta.
Jas. Speakman, Calgary, Alberta.
W. H. Snelson, Irrigation Branch, Department of the Interior, Calgary, Alberta.
Robert Sharp, Suffield, Alberta.
B. S. Smith, Canadian Pacific Railway, Calgary, Alberta.
J. H. Salmons, Gleichen, Alberta.
W. S. Siler, Bassano, Alberta.
W. Slocam, Brooks, Alberta.
A. E. Spurgeon, Namaka, Alberta.
Robert J. C. Stead, Canadian Pacific Railway, Calgary, Alberta.
R. S. Stockton, Canadian Pacific Railway, Strathmore, Alberta.
T. Schulte, Strathmore, Alberta.
C. W. Stokes, Canadian Pacific Railway, Calgary, Alberta.
J. W. Shoop, Bassano, Alberta.
F. G. Sanderson, 82nd Battalion, Calgary, Alberta.
T. M. Tweedie, Calgary, Alberta.
Geo. Travis, Bassano, Alberta.
W. D. Trego, Gleichen, Alberta.
C. T. Thonetz, Strathmore, Alberta.
R. A. Travis, Bassano, Alberta.
John Thompson, Strathmore, Alberta.
T. H. Tiney, Medicine Hat, Alberta.
F. Unsworth, Maple Creek, Sask.
J. A. Valiquette, President Board of Trade, Calgary, Alberta.
G. D. Walters, Irrigation Branch, Department of Interior, Calgary, Alberta.
W. B. Whitcanack, Keoma, Alberta.
W. C. Wright, Wall Hollow, N.D.
C. A. Wayne, Bassano, Alberta.
Lewis Welsford, Suffield, Alberta.
G. S. Warren, Ouelletteville, Alberta.
R. S. Walters, Hutton, Alberta.
J. H. Wright, Gleichen, Alberta.
J. Wright, Bassano, Alberta.
Robert West, Strathmore, Alberta.
W. J. Yeo, Bassano, Alberta.
Wm. McGie Young, Canadian Society of Civil Engineers, Victoria, B.C.

CHAIRMAN: Mr. Don H. Bark will now address the Convention on,—

"PRACTICAL IRRIGATION HINTS FOR ALBERTA".

MR. BARK: No two crops require the same amount of moisture for their best growth of maximum production. Neither do they require their moisture at the same season of the year. Grains require the least water of any crop we raise, and alfalfa and pasture grasses require the most water, while the requirement of potatoes falls somewhere between that of the grains and alfalfa. Assuming the foregoing to be true, even one who has never farmed can readily see that the maximum yields of a variety of crops upon the same farm the same year are impossible without irrigation. The irrigation farmer is therefore confronted by many more intricate problems than his neighbour, who secures or attempts to secure his moisture from precipitation. He must not only understand how to prepare the land and plant and harvest his crops in the best possible manner, but must understand in addition how to prepare land for irrigation, and when and how to irrigate all of the various crops in the best possible manner.

All of this may sound somewhat difficult to the uninitiated, but when one realizes that not only every business man but every farmer as well must be a student these days if he wishes to succeed, he will find that it is surprising how soon any farmer can pick up enough irrigation knowledge to make a success on an irrigated farm, provided he has good soil and an ample supply of water at his command.

Irrigation of course necessitates an extra amount of time and trouble, but there can be no doubt that the irrigation farmer's profits are more than sufficient to offset the extra amount of time and expense involved, for but few successful irrigators are ever again content to farm under humid conditions. The irrigation farmer, however, must never cease to study his problems, and I sincerely trust that in discussing the subject of "Practical Irrigation Hints for Alberta" my ten years' service in irrigation work with the United States Department of Agriculture will be of some help to the irrigators of this section.

In taking up this subject I wish to discuss it from the standpoint of the farmer irrigator, and while the space allotted to this paper is far too brief to make a general discussion of irrigation, I hope to at least touch upon all the more important phases of the problem, and will start with a farm consisting of virgin prairie, in which condition most of you either have started or will start.

GENERAL SURVEY OF THE FARM.

By all means the first thing to do with an irrigated farm, even before it is ploughed, is to go over it carefully and decide just how the water will run, and where the ditches should be made on each field, for the contour of the land will largely determine, not only the size and shape, but the location of each field as well. A general plan of how the entire farm will look after it is all

laid out and planted should be formulated at least in one's mind, if not on paper, before the first crop is planted, else there will finally be as much or more lack of system to it than to some of the houses that we frequently see, with half a dozen or more additions.

One should plan the farm and lay out the field so that there will be a drain ditch as well as a head ditch for each field, for it is fully as important to get the excess water off as it is to get the irrigation water on. Wherever possible each field should be planted so that it can be irrigated through a ditch of its own, though of course it is not objectionable in the case of a large field to be compelled to bring water to it through two or more small laterals. Do not, however, for the sake of square or rectangular fields, plant say a narrow strip of grain or alfalfa on the lower side of the ditch, and then fill out the remainder of the field with some other crop, thus making it necessary to irrigate both crops simultaneously from the one ditch. Plan to have the field ditches, the location of which are more or less determined by the topography, the dividing line between the different crops or different fields of the same crop.

LAYING OUT DITCHES.

Do not run ditches by guess. Many have been so laid out and constructed, but as water will not run up hill, it is best to have them laid out properly with an instrument, for the rolling topography of this country is very deceptive. It is not necessary to hire any one to do this—if you are located on either the Eastern or Western Section of the C. P. R. Irrigation Block, the Company will be glad to furnish a man to do this for you, and if you are not so located you can run your own ditches. A cheap and efficient instrument with a good clear telescope, good enough to use in connection with any ordinary farm irrigation problem can be purchased complete anywhere in the States for $16., and should not cost more than $20 here. I have levelled many a field and ran many a farm lateral with a pair of $1.25 sights attached to an ordinary carpenter's level, using a red rag tied around the handle of an ordinary hoe or garden rake for a levelling rod and target.

GRADE OF FARM DITCHES.

The topography may in many cases determine the grade of the ditch, but wherever possible the ditches that are to be irrigated out of should have a comparatively flat slope, such as from one-tenth to three-tenths foot fall per hundred feet, two-tenths foot per hundred being about right. The ditches should be laid out and staked out, but not built before any surface levelling is done, for the amount of levelling found necessary will be determined by the location of the ditch with respect to the surface of the land to be irrigated from it.

SELECTION OF IRRIGATION SYSTEM.

The next step in the preliminary work of laying out and preparing the farm is the selection of the type of irrigation system that is to be used, for the

amount and method of levelling will be largely determined by the kind of system. There are three types of surface irrigation that are adapted to this locality, namely (1) free flooding, (2) the furrow or corrugation system, and (3) flooding between borders, and as above indicated, it will be necessary to decide which one is to be used before the levelling is started.

For the information of those who are unfamiliar with the different types of irrigation, I will endeavour to describe each system briefly.

FREE FLOODING.

Free flooding is probably the earliest system of irrigation that was practised in the West. It is as well the most crude system. It is, however, practically the only system I have yet seen in use in Alberta. It consists of running more or less parallel contour ditches across a field from fifty to two hundred feet apart, each ditch being given just sufficient grade so that the water will flow nicely, probably one-tenth or two-tenths fall for each hundred feet. The ground is then levelled between the ditches with a rectangular leveller, the larger knolls first being taken off with a Fresno or other similar scraper. The ground

Levelling Land for Irrigation by means of a "Float."

can really be levelled to better advantage before the ditches are constructed, though as has been above stated, a knowledge of the location of each ditch will help considerably and minimize the work of levelling. It is a good plan to lay out and definitely locate each ditch with a plough furrow before beginning any levelling. The ditches can then be permanently constructed after the levelling is completed, the original location of the ditches being traced by the plough furrows. The irrigation with this type of system is done by starting at

the top of the field and placing sod, brush or canvas checks in the contour ditches at frequent intervals, allowing the water to flow out through openings made in the ditch bank, the irrigator spreading the water as evenly as possible between the ditch being used and the one next below it, which if the slope is uniform, acts as a waste ditch for the strip above and a head ditch for the strip below. As has been stated, this is probably the cheapest, crudest, and least efficent of any of the irrigation systems that are now being used in the West, for there are less provisions made to control the water than with the other more efficient systems, yet with careful levelling and careful attention to the application of the water very good results can be secured by the use of this system.

FURROW OR CORRUGATION SYSTEM.

This system of irrigation is in quite general use in a large number of the irrigated districts of Washington, Idaho and Utah, where it is used for practically all kinds of crops, including alfalfa. It also is used quite generally in practically all localities for all rowed or cultivated crops. The land is prepared for this system of irrigation in practically the same manner for the free flooding, though a little more even application can be secured from it than with the free flooding system with the same amount of preparation. The furrows are usually run down the greatest slope unless it is excessive, in which case they angle down the slope on a lesser grade. The furrows are made from two to three feet apart, the spacing depending upon the nature of the soil, the closer spacing being used with the heavier soils, and as they normally run down the steepest slope they usually lie more or less at right angles to the contour ditches, which feed them. These furrows are made with tools constructed especially for the purpose, which more or less resemble the front runners of a bob sleigh, the furrows normally being made in the soft ground, immediately after the wheat, oats or alfalfa is planted. If the furrows are made at this time before the seeds are sprouted, the crop will come up and grow in the furrows about as well as it does between them. The water is applied with this system by turning a very small amount into each furrow and allowing it to run until the water has subbed across, and met midway between the furrows, which is usually from 6 to 18 hours depending on the porosity of the soil. This system has the advantage over the free flooding system in that the furrows can be made to carry water across slight depressions and knolls, and at the same time secure a more even application of the water than can be secured with the flooding system. Advocates of this system also claim that the soil does not bake so much after irrigation, as there has been no water applied directly to the surface except in the bottom of the furrows. The ordinary irrigator can probably irrigate about 20 per cent more land in a day with the free flooding system than with the furrow system, but with the small farm there is little doubt that the freedom from baking and the more even application more than offset the extra time required. Considering the size of our farming operations here, however, the extra amount of time required would be quite a

factor, and it is hardly advisable to plan on using the furrow system here, for either grain, alfalfa or pasture, but it will have to be used for all cultivated crops, such as corn, potatoes, small fruits or garden.

The Furrow System of Irrigation.

FLOODING BETWEEN BORDERS.

This system is probably the best system of irrigation for practically all classes of soil in this part of Alberta, and irrigators of this section cannot be too strongly urged to instal it. It is but little more expensive to instal, than the free flooding system, if it is laid out by one who understands it, and can take advantage of the natural topography of the farm. With a few repairs on the dykes, it is good for practically all time, when once installed. One can also irrigate more land in a day with it than any other system, and at the same time secure a more even application of the water. This system consists essentially of flooding the water down the greatest slope, unless it is excessive, between more or less parallel border dykes 30 to 50 feet apart, and from 200 to 400 feet long between cross ditches. These dykes are usually laid out so as to run down the greatest slope. The head ditches cross the dykes and the intervening border strips more or less at right angles, and are laid out and constructed much the same as with either the furrow or free flooding system. To be ideally prepared for this system of irrigation the side fall should be taken out between the borders; in other words each strip should be perfectly flat cross-ways. This, however, is rarely done in practice, but the nearer it is approached the more easily the land will be irrigated. If the borders are properly levelled between the dykes the irrigation is very easy, for when the water is turned into the upper end of each border, a sheet of uniform

depth will advance slowly down the slope between the border dykes, thus wetting each spot uniformly. The irrigator with a little practice and knowledge of the lay of the land will soon become acquainted with the performance of the water on each strip, so that he can tell just how far to allow the water to advance before turning it off and diverting it into the upper end of the next strip. In practice just sufficient water should be turned into each strip so that it will advance to the lower end and without waste. These border dykes are made rather broad and low, and should not be over 4 to 6 inches high in the centre and approximately 3 feet wide at the base, when finished and finally settled down, so broad and low in other words that the haying machinery and wagons can work across them to advantage. The dykes are either constructed with the scrapers which are used for levelling down the higher knolls on the land or can be made by ploughing a back furrow of the location of each dyke, after which each back furrow should be gone over with a ridger, pulling the same lengthways of the back furrow. This ridger is constructed of two 2x12 planks, some 18 feet long, the planks being placed on edge about 12 feet apart in front and 3 feet apart behind. They are thoroughly braced in this position and are pulled lengthways of the back furrow with two horses, the wide spread of the planks in front drawing considerable dirt from each side to the back furrow in the middle, thus filling the furrow on each side and making a substantial ridge. This ridge is afterwards rounded down by harrowing very gently. When seeding, the tops of the ridges or border dykes are seeded at the same time and at the same rate as the remainder of the field, and without climate, practically the same amount of crop will be raised on top of the dykes as between them. This type of system is adapted to almost any field crop, any type of soil, and almost any topography, unless the slope is excessive, and it is believed that if it is once installed, even on a small tract, on a few of our farms, the farmers will find irrigation so easy that they will hasten to prepare as much as possible of the remainder of their farms in this same manner.

LEVELLING.

Levelling should be well done, for whatever is spent or done along this line never has to be done over again. The bother of trying to get water on some little knoll, together with the decreased yield on this knoll because of insufficient moisture will usually cause enough loss in one year to more than offset the original cost of having removed the knoll with a team and scraper at the outset. Some fields will of course require more levelling than others; a safe rule to go by is to so level each field that the water will flow uninterruptedly without pooling up from every cross ditch to the next one below. I shall not dwell much on the levelling of land, for it is a simple operation that almost anyone can soon learn, the principal requisite being a goodly amount of time, patience, and stick-to-it-iveness. The principal tools to use are the Fresno scraper for the larger knolls and the rectangular float leveller for

the smaller knolls. I wish to emphasize, however, that every irrigated field should be thoroughly levelled with a rectangular plank leveller every time a crop is planted on it even though it is every spring, and that whatever time or money is spent in levelling will pay larger returns than the expenditure of any other like amount on the farm.

CONSTRUCTION OF DITCHES.

The construction of farm ditches is indeed simpler than most of the uninitiated can readily believe. Our soil here is so free from rocks that practically the only work of constructing the ditch, after it is laid out on the proper grade, is to plough from two to six plough furrows on the desired location, and then run an ordinary A-ditcher or crowder through the ditch, placing the most of the dirt on the down-hill side. Two men and a team will easily

Constructing an Irrigation Ditch.

make as much as two miles or more per day of ordinary distribution ditch on the farm. One man and two horses with an ordinary double mould board or lister plough can make the smaller ditches at one operation, thus making eight or ten miles per day, while the larger ditches up to four second-feet capacity are now made with the same but larger type of plough, from four to eight horses being required. Ditches should be made good and strong. Do not be afraid to make the banks of important ditches like the one supplying the entire field too high or too strong, for as soon as they are wet the dirt will settle and the extra strength may be necessary. It certainly does not pay when the need of irrigation water is urgent, and one is trying to irrigate his

alfalfa or pasture, to be compelled to go up above and spend a day or two enlarging and strengthening the ditch, which conducts the water onto the farm or tract in question. Careful irrigators usually clean out and repair their ditches every spring.

Whenever it is necessary to cross a hollow with a ditch either a dyke flume or inverted siphon will be found necessary. Where the hollow is not over one hundred feet across and two or three feet deep, I should advise an earth fill or dyke. If the same be properly and substantially made and the gophers are kept out of it, it will last for years, with but a small amount of repairs, particularly if enough care is taken to seed the side slopes and banks of the dykes with a little blue grass and white clover. Care should be used when building dykes to make them sufficiently high and strong as to allow for settlement after the water is turned in.

With deeper hollows or draws, particularly where the span is not great, either timber or metal flumes should be installed. Attention should be given that the proper grade and capacity be secured, and also that the foundation and super-structure is solid. Inverted pipe siphon for farm use would hardly be recommended in this climate.

DIVERSIFICATION OF CROPS.

A well conducted profitable farm not only in Alberta, but anywhere else, should have the crops and products well diversified. It is never a good plan to put one's eggs all in one basket. There is too much of this being done here now. Too much grain, and not enough of other things. If we should happen to have a poor year for grain, with inferior prices, the farmer with only eighty acres or a quarter-section of grain could hardly make a living and meet his payments, while if he had a part of his farm devoted to alfalfa and pasture grasses, with a few cows, pigs, chickens, etc., with also some surplus horses to sell each year, the fertility of the land would not only be maintained, but a poor year of any one crop would not materially affect him, no matter what the season or how bad the market, for he would always be sure of making his living with enough to spare to meet his obligations. The crops of any well conducted irrigated farm in this section should include at least garden, potatoes, alfalfa, clover and pasture grasses, as well as grain.

PLANTING CROPS.

Space will not permit much to be said in regard to the planting of the crops on an irrigated farm. I wish, however, to state that irrigation farming can withstand and requires thicker planting than dry farming. The usual custom throughout the Northwest is to plant about 15 pounds of alfalfa seed per acre, 12 pounds of red clover, 100 to 110 pounds of wheat seeded in the spring, 90 pounds of oats and 800 to 1,000 pounds of potatoes. I wish to emphasize the necessity of careful preparation of the seed bed. Grain crops should be planted with a drill at least 2 inches deep, thus placing the seeds

in moist ground, which can be done to much better advantage than by the broadcasting method. If crops are planted in rough, cloddy ground the germination is bound to be poor, and an uneven stand will be the result. Careful preparation therefore pays good returns; an extra harrowing or discing before planting the crop has sometimes been known to double the yield. A fine uniform seed bed is particularly necessary when crops with small seeds, such as alfalfa or clover are planted. Neither alfalfa nor clover will stand such deep planting as will the larger seeds of the grains. From one inch to one and one-half inches is as deep as alfalfa or clover should be planted.

IRRIGATION OF CROPS.

There is so much to say in regard to the irrigation of crops, even after they are properly planted on properly prepared land, that I can hardly touch the high spots. Enough could be said about the stage of growth alone at which crops require different amounts of moisture to more than utilize my time.

The average irrigation farmer of Alberta would probably not be interested in all of the details of the latest experiments along this line, so I shall endeavour to call your attention to but a few of the fundamentals, and if there are any who wish to go deeper into the subject I shall be glad to do that at some later date.

Grain has been found to require the most soil moisture during the heading, flowering and soft dough stages. The soil can safely be allowed to begin to dry out as the grain is approaching hard dough, as there is then sufficent strength in the straw to fill and mature the grain. At other stages of its growth grain simply needs only sufficient moisture to keep it growing rapidly.

Alfalfa should be planted on well drained land and requires a continuous supply of moisture throughout the season, from the time the ground warms up in the spring until just before the last crop is harvested. The number of irrigations required during the season to obtain this soil moisture condition will be largely dependent upon the season, and will vary in this locality from one to three. As the ground is quite cool early in the spring it would probably not be advisable to irrigate alfalfa very early, say during April of normal years, nor as late in the fall as October, unless the fall were very dry. Alfalfa though it will not do well on wet, soggy soil, requires fully twice as much water during the year as grain. This is due to the rapidity of its growth and the immense amount of evaporation and transpiration that takes place from the large amount of leaf surface that is exposed throughout the season. My experiments while with the United States Government showed that where a maximum crop of grain requires one acre-foot of water during the season, fully two acre-feet per acre are required for a maximum crop of alfalfa. Alfalfa, however, should not be allowed to go into winter quarters with the soil in a wet and soggy condition. The freezing and thawing which takes place with the soil in this condition is liable to cause winter killing.

The question when to irrigate is best answered by saying, whenever the percentage of soil moisture is low enough so that the crop requires it. There can be no hard and fast rule laid down as to when to irrigate one's crop, be-

cause as much depends upon the soil and the crop itself as upon the climate. One should know at what stage of growth a crop needs the most soil moisture and then watch the condition of one's soil. Whenever the soil from 6 inches to 1 foot in depth in close proximity to the roots of the plant becomes so dry that when squeezed together in the hand and released it falls apart through lack of sufficient moisture to give it sufficient cohesion, then irrigation is required. The old experienced irrgator can also tell when crops need irrigation by the colour of the crops themselves. A dark, blackish green colour indicates that they are needing water, while a light pea green colour indicates that sufficient water is available for the time being. This difference in colour is particularly noticeable with alfalfa and potatoes.

Potatoes require a medium but uniform moisture content in the soil throughout the season. They should never be allowed to dry out and suffer for lack of moisture, particularly after the young tubers begin to form. Potatoes, the same as alfalfa, are a crop that will not do well in wet, soggy soil—

Irrigating Grain.

yet they require considerable irrigation water in order to produce a maximum yield. They should preferably be hilled up pretty well and irrigated with a small stream in a rather deep furrow between the rows, thus allowing the moisture to reach the soil around the tubers in the hills by capillary attraction, which will not allow of over-saturation of the soil.

In actual practice the new irrigator is always inclined to use too much water, thinking that if a little irrigation is good, more is better. This, however, is a mistake, for too much irrigation is sometimes worse than none at all. Irrigation might be likened in its effect upon the soil and crops to a tonic with the human system—when given in proper doses. The proper amount

given or applied when necessary and at the right time produces wonderful results, but a double or triple dose usually overdoes the matter and gives poorer returns than if none at all had been used.

Some do not believe that we need irrigation in this part of Alberta, but there are so many fundamental arguments that show conclusively that irrigation is not only desirable, but absolutely necessary nine years out of ten, if maximum crops are to be produced, that it is hard to believe otherwise. Our soils here contain a certain small amount of alkali, as do all arid and semi-arid soils, and the very presence of this alkali proves conclusively that there is insufficient rainfall here to produce a good crop every year, else this alkali would have been leached out long ago. The absence of trees on the prairies is another almost positive indication that there is insufficient rain here to produce good crops every year, for trees can actually be grown with less water than almost any other of the staple crops. It is therefore apparent that there would be many more trees on our prairies if the normal precipitation were sufficient for the production of good crops every year.

Wheat—A Good Crop.

The bumper crops that have been produced during the past season *without* irrigation is in fact, however, one of the most positive proofs of the need of supplementary moisture (irrigation) during eight or nine years out of every ten, or during all but the very wettest of seasons. Thrashing is now well advanced, and it is a well known fact that taking it far and wide more high yields have been reported over a very wide scope of territory than have ever been produced before. Aside from the precipitation, the climatic conditions have not been unusual in any way during the season, yet the precipitation dur-

ing the five growing months has ranged from 150 per cent of normal to as high as 300 and more per cent, of the amount received during the same period in the drier years. These large yields have therefore absolutely demonstrated not only what our soil is capable of producing, but have also proved beyond all doubt that our crops need supplementary moisture (irrigation) in addition to the normal precipitation eight or nine years out of every ten, in order to continually produce year after year the maximum of which our soil is capable.

The last, or 1910, census of the United States, gives some particularly conclusive figures showing the difference in yields and values of the different crops between the entire irrigated area and the entire non-irrigated area of the United States. These figures are averages, and cover many different climatic conditions, but as they also cover an extremely large area, far more than the entire cultivated area of Canada, they are very dependable, and should show at least a fair comparison of the increase that can be made in the yield here by means of irrigation. The following figures are copied direct from page 856 of the printed report of the United States Irrigation Census of 1910, and show quite clearly how much the yields of the staple crops in the United States are increased by means of irrigation:

	Average yield per acre		Increased				Increased
	On Irrigated land arid region	On Unirrigated land entire United States	yield on irrig. land per cent	Av. val. per acre On Ir. land	On Unir. land	Amt.	Val. per acre per cent
Crop							
Alfalfa	2.94 T.	2.14 T.	37.4	$22.94	$10.97	5.97	35.2
Oats	36.8	28.5	29.1	19.00	11.64	7.36	63.2
Wheat	25.6	15.3	67.3	23.40	14.75	8.65	58.6
Barley	29.1	22.3	30.5	18.32	11.81	6.51	55.1
Timothy	1.73 T.	1.22 T.	41.8	15.84	12.75	3.08	24.1

In conclusion I wish to emphasize the major points that have been included in this paper, principal among which are:

(1) Be sure that the farm is properly laid out before any levelling or ditching is started, for the ultimate success of the farm frequently depends upon the adaptability of the initial plans.

(2) Run all the ditches on the proper grades with some kind of an efficient instrument. The proper grade for an internal farm ditch is approximately .2 foot fall per hundred feet.

(3) Be sure that the proper system of irrigation is selected, and do not forget that free flooding is the most crude system of irrigation in vogue, and that flooding between borders is best adapted to our conditions here on all but the steeper grades for practically all classes of crops, except rowed crops.

(4) Bear in mind that proper and efficient levelling of the land is absolutely necessary if good results are to be secured, and that time and money

spent in levelling will pay larger returns than the expenditure of any other like amount.

(5) In constructing ditches be sure that they are made large enough and strong enough, and do not forget to clean the silt and weeds out of them every spring.

(6) Do not run water too far between cross ditches; from 50 to 300 feet, depending upon the topography, is far enough—for an even distribution cannot be secured where it is flooded too far.

(7) A good seed bed should be prepared for any kind of crop. A good even stand cannot be secured in rough cloddy ground.

(8) Do not irrigate your crops unless they need it.

(9) Remember that grain needs the most soil moisture during the heading, flowering and soft dough stages, and that alfalfa and pasture need a continuous supply throughout the growing season, and that they require nearly twice as much water as grain, if all other conditions are similar. Do not let potatoes dry out after the young tubers have begun to form, until just before harvest time; for if you do, rough, uneven potatoes of low market value will be produced.

Alfalfa in Stook.

(10) Do not let any crop suffer for lack of water during any period of the year, for a week's drought particularly in the early stages of the plant's growth will not only delay the ripening period, but may also decrease the yield as much as fifty per cent.

Remember that diversification of crops is absolutely essential for the best success of any farmer in almost any district, for the one crop farmer is rarely successful over a long period of years in any locality. When one stops to think of the beauties and many advantages of farming under an efficient irrigation ditch where the moisture which is so necessary for the production of large and profitable crops can be turned on and off at will, he can not help but pity the dry farmer. Diversification and irrigation are certainly the very best insurance one can have against the ill effects of hail, frost, rain, drought, poor prices, and hard times. (Applause)

CHAIRMAN: I have no doubt that Mr. Bark has a lot more that would be of interest to us and I would ask him if he would be good enough to let the Executive Committee have any further paper that he may prepare so that the Committee can consider publishing same.

CHAIRMAN: The next will be the place of meeting for the next Convention. I nominate Mr. F. W. Crandall and Mr. Higginbotham as scrutineers and the voting will be by ballot. We have decided to give the proposer or mover of any place ten minutes and the seconder or other supporter five minutes each.

SECRETARY: I will read the communications received from the cities of Nelson and Kamloops. I might also say there is a note at page 215 of last year's report referring to the next place of meeting.

"Kamloops, B. C., 22nd November, 1915.

The President and Members,
Western Canada Irrigation Association,
Bassano, Alta.

On behalf of the Municipal Council I beg to extend to the Western Canada Irrigation Association an invitation to hold its next annual convention at the city of Kamloops.

(Signed) M. F. Crawford,
Mayor."

JOS.

"Nelson, B. C., Nov. 18th, 1915.

R. A. Travis, Esq.,
Secretary, Western Canada Irrigation Convention,
Bassano, Alberta.

Dear Sir:—

I beg to enclose "Memorandum of Appointment". Our delegate will be Mr. James Johnstone, and I believe the city of Nelson has arranged for the sending also of a delegate. The delegates have the full authority to extend to the delegates of the Convention an invitation to hold their next meeting at Nelson, B.C. I can assure you the citizens of Nelson and the Kootenays, also the Boundary districts, will consider it a great privilege to be given the honour of attending to the delegates of the Convention if they should decide to meet

in Nelson. That is, it would be our earnest desire to do everything possible to extend all the comforts that are usual on these occasions. Besides, I am justified in stating that a Convention held in the interior of British Columbia would add greatly to the success of your Association.

Wishing every success to the 9th Annual Convention,

Yours very truly,
(Signed) Fred A. Starkey,
President, Associated
Boards of Trade—of Eastern B. C."

"CORPORATION OF THE CITY OF NELSON.

Nelson, B. C., 20th November, 1915.

To

The President , Officers and Members
attending the Ninth Annual Convention of the Western Canada Irrigation Association at Bassano.

Gentlemen:—

The City of Nelson and Kootenay District of British Columbia beg to extend to you a most hearty invitation to hold your Tenth Convention in the city of Nelson.

The City Council, at its regular meeting held in the City Hall, Nelson, on the 8th of November last, passed the following resolution unanimously:

"That the Mayor and Council of Nelson extend a very hearty invitation to the Western Canada Irrigation Association to hold their annual Convention of 1916 in the city of Nelson."

The Nelson Board of Trade at its meeting held in the Board of Trade Rooms, Nelson, on November 11th last, passed the following Resolution unanimously:

"That a cordial invitation be, and the same is hereby extended by the Nelson board of Trade to the Western Canada Irrigation Association, to hold their annual 1916 Convention in the city of Nelson, and that a copy of this resolution be forwarded the said Association at the coming Convention at Bassano, Alta."

In extending to you this invitation, we feel that there never was a time when conditions made it so important that your Convention should be held in a principal consuming centre of the products of the Irrigated Lands of Western Canada. Many of you have now learned how to produce the finest of irrigated products, but the most successful method of marketing same has yet to be solved.

The mining industry of British Columbia, of which Nelson is the business centre, has entered upon a period of great prosperity and advancement, founded upon the intelligent development of the immense natural wealth stored in our mountains. This means an ever increasing demand for the products of the soil.

The necessity of a closer connection between producer and consumer is constantly being pointed out on all sides in order to bring about mutual prosperity, and the greatest factor in this direction is a personal acquaintance between the Producer and Consumer, and this can be accomplished in no easier and better way than by your coming amongst us at your next Convention.

Nelson district is noted for the quality of its fruit and vegetables and many sections, of which Nelson is the commercial centre, depend upon irrigation in order to secure the best results.

Nelson, as many of you know, is situated in the heart of, and is surrounded by, the most charming mountain and lake scenery in the World, and its climatic conditions are unsurpassed."

For these reasons we know that your members would hold a profitable and pleasant Convention here in 1916; we can assure you that we will do everything in our power to make your Convention an outstanding one for profit and pleasure.

Signed on behalf of the City Council,

(Signed) John J. Malone,
Mayor.

For the Board of Trade
(Signed R. W. Hinton,
President.

(Signed) D. C. M. Morris,
Secretary."

SENATOR BOSTOCK: In moving that the next place of meeting should be the city of Kamloops, said:

MR. CHAIRMAN: Ladies and Gentlemen,—I have the honour to present the invitation of the city of Kamloops.

> "To the President and members of the Western Canada Irrigation Association, at Bassano, Alberta, Gentlemen: On behalf of the Municipal Council, I beg to extend to the Western Canada Irrigation Association an invitation to hold its next annual Convention at the city of Kamloops. Signed, M. F. Crawford, Mayor."

I may say, as has been referred to by the Secretary, the delegates from Kamloops announced their intention of making a bid to hold this Convention at Kamloops next year and to this Convention they have sent down six or seven delegates, representing irrigationists and businesses connected with irrigation in the Kamloops District, Mr. Lawrence, representng the Board of Trade, Mr. J. L. Brown, President of the Agricultural Association; Mr. Johnston, one of the Aldermen of the City, and Mr. Dobson, also an Alderman of the city of Kamloops. These gentlemen will no doubt give you their reasons why from their standpoints, the Convention should be held at Kamloops next year. Seconded by Mr. Dobson.

Messrs. Lawrence, Brown, Johnston and Dobson were then heard from as to the invitation and wish of the city of Kamloops that the next Convention of this Association should be held in their city.

MR. JOHNSTONE: (NELSON) speaks as to the invitation and wish of the city of Nelson that the Convention be held at that city and moves accordingly. This motion was seconded by Mr. Marnoch.

CHAIRMAN: There are apparently only two places. One is Kamloops and the other is Nelson. Ballots will be distributed and each person can vote for either Kamloops or Nelson.

A ballot was thereupon taken.

CHAIRMAN: The vote stands Kamloops 30, Nelson 12. I therefore declare Kamloops as the next place of meeting. (Loud Applause).

The meeting will now adjourn to meet again at 2 o'clock this afternoon.

AFTERNOON SESSION—Thursday, November 25, 1915.

CHAIRMAN: We will now hear an address from Mr. G. D. Walters, Irrigation Branch, Department of the Interior, Calgary.

MR. WALTERS: Mr. Chairman, Ladies and Gentlemen,—The investigation of the amount of water required by irrigation to produce maximum profitable yield, with the most economical use of the water, brings us to one of the most economical use of the water, brings us to one of the most important problems that confronts this Congress, as a proper understanding of this question and of those conditions peculiar to irrigation farming will alone make it possible to utilize to the best advantage the water that is available for irrigation.

The excessive use of water is not only wasteful, but it very often interferes with proper plant growth, which results in decreased yield, and unless the natural drainage channels of the country are such as to take off this excess water, it very often very seriously affects the soil. The rise of alkali, which is almost always found in arid and semi-arid districts, is directly due to the use of too much water. With the judicious use of irrigation water and proper methods of cultivation, damage from this source may usually be corrected even on those soils that are very heavily impregnated with these injurious salts. So, though there is the necessity of being assured that a sufficient supply of water is available, care should be taken to supply only that amount that is required for good production.

During the past three years the Irrigation Branch of the Department of the Interior has been conducting "Duty of Water Investigations" in the irrigated districts of Alberta. The work was commenced in the irrigation district about Coaldale in 1913. It has, however, since its inception, consisted of more than the gathering of data for the determination of the "Duty of Water." The men employed by this department have always been at the service of the farmer to assist him to those better methods of irrigation practice. In 1914 we begun similar experimental work at Strathmore, and at the beginning of this last season we started, in the Western Section of the Canadian Pacific Irrigation Block, the work of field irrigation demonstration. At these demonstration plots, which are conducted with the co-operation of the farmers, we are putting into practice those principles of irrigation farming that we find to be most successful.

In our duty of water investigation we realize that to obtain data for the determination of a practical duty, one that will be applicable to large irrigation systems, the investigation must be carried on under ordinary field conditions, and that, if any experimental work be done on small tracts, the methods used must be such that the results obtained may, at least, be approximated by the average farmer. The mere determination of the water applied, however, and the yield obtained would not necessarily indicate that the proper amount had been used, so whenever possible we are asking the farmer to set aside a portion of each tract upon which we are conducting measurements; this portion of the main tract is then divided into two equal parts, one part to be given a lighter irrigation than the main tract, the other a heavier. The return in yield from these three portions will show which of the amounts applied was the most beneficial. We find that the farmers are, with but few exceptions, very glad to co-operate with us in the work. Unforeseen conditions, however, sometimes occur which make it advisable to vary the programme outlined earlier in the season. I trust that in the future we may find the same hearty co-operation that has been given us, and the interest that has been shown in this work in the past.

I will point out to you some of the factors, as we find them in our irrigated districts, which affect, and how they affect, the amount of water required by irrigation.

First are the climatic conditions, which include the rainfall and its distribution, the temperature, the humidity and the wind. Generally speaking the more rain the less irrigation water required. This is not necessarily always true. Irrigation is being practised on a very large scale in some countries where the annual rainfall is very heavy, just because this rainfall does not come at a time when it may be utilized by the crops that are grown.

Let us look at our rainfall and temperature records for several stations scattered over the irrigated districts of southern Alberta and southwestern Saskatchewan, for the years 1903 to 1914. The yearly mean rainfall for these stations varies from 10.72 inches for Medicine Hat to 16.57 inches for Calgary. That for Gleichen is 14.24 inches, Swift Current 14.58 inches, and that for Lethbridge 14.99 inches. Had we included the heavy rainfall for 1902 the average for Lethbridge would be 16 inches.

The mean rainfall for April to September inclusive for these same years varies from 7.77 inches for Medicine Hat to 13.26 inches for Calgary, while that for Gleichen, Swift Current and Lethbridge is 11.30, 10.95 and 11.11 inches respectively. Of this the greatest portion falls within the months of May to August inclusive; while that of the six months, October to April inclusive comes at such a time and in such amounts that it is probable that very little of it is available for crops.

TABLE SHOWING MEAN MONTHLY PRECIPITATION.

1903—1914.

	Calgary	Lethbridge	Gleichen	Medicine Hat	Swift Current
January	.47	.75	.65	.52	.56
February	.44	.52	.43	.44	.52
March	.79	.63	.32	.44	.72
April	.80	.69	.59	.52	.67
May	2.68	2.47	2.57	1.83	1.88
June	3.36	2.84	2.70	2.12	3.26
July	2.11	1.36	2.40	1.16	2.24
August	3.20	2.19	2.19	1.41	1.87
September	1.11	1.56	.85	.73	1.03
October	.73	.89	1.02	.67	.74
November	.63	.59	.26	.49	.51
December	.25	.50	.26	.39	.58
Yearly Mean	16.57	14.99	14.24	10.72	14.58
Means April to Sept.	13.26	11.11	11.30	7.77	10.95

TABLE SHOWING MEAN MONTHLY TEMPERATURES

1903—1914.

	Calgary	Lethbridge	Medicine Hat	Swift Current	Gleichen
January	11.6	15.1	14.0	12.0	6.8
February	16.6	18.3	15.3	9.7	9.2
March	23.6	28.0	28.7	22.7	26.2
April	40.7	43.9	46.0	41.9	40.7
May	48.0	51.3	54.4	50.2	48.1
June	56.6	59.9	63.9	60.7	56.7
July	61.0	64.8	69.0	65.0	61.7
August	57.9	62.3	66.0	62.4	58.7
September	50.9	54.0	57.7	53.4	50.5
October	42.3	45.0	46.8	42.7	41.1
November	29.0	33.0	33.3	28.6	28.5
December	22.1	24.6	23.0	17.4	18.0
Yearly Mean	38.4	41.7	43.2	38.9	37.2
Means April to Sept. inch.	52.5	56.0	59.5	55.6	52.7

The yearly mean temperatures for these same stations for these years vary from 37.4 degrees for Gleichen to 43.2 degrees for Medicine Hat. That of Calgary is 38.4 degrees, Swift Current 38.9 degrees, and Lethbridge 41.7 de-

grees. The mean temperatures for the months of April to September inclusive vary from 52.5 degrees for Calgary to 59.5 degrees for Medicine Hat. The mean monthly temperature for each station is higher than 50 degrees for each of the months from June to September inclusive.

If we except Medicine Hat, the factors of rainfall with its distribution and the temperature are very similar. We would then expect, as far as these two factors are concerned, that the water requirements by irrigation would also be similar.

Let us look at the distribution of the rainfall for the months of April to September inclusive, for the last three seasons, in the irrigated districts near Coaldale, Alta. The 1913 records were taken at the Dominion Experimental Farm at Lethbridge. During 1913 we had two drought periods—the first extending from May 17 to June 17, during which time less than one-half inch of rain fell. Grain crops that were not irrigated before or during this drought suffered greatly. The second dry period, which occurred in July, was not so serious, yet it did slightly injure those crops that were not well watered earlier in the season. In 1914 very little rain fell during the period from 1st of April to 25th of June, so that early in the growth of the plant there was but little moisture in the soil at a period when it was especially needed. The rainfall for the rest of these months was also very light. In 1915, although but little rain fell in April, the soil, due to the heavy snow of the previous fall, held a very fair amount of moisture. The heavy rains followed and the very dry period of August brought a very heavy crop to maturity.

A careful study of the distribution of the daily rainfall for southern Alberta shows the average distribution to be very similar to that of the year 1913. That is, that we can expect at least one dry period, and often two, during most years.

There can be no doubt that if we, by irrigation, can properly supplement the rainfall, we should usually obtain as good crops as were secured this last season, 1915.

The proper time then to apply water naturally depends upon the distribution of the rainfall. Too often we are inclined to defer irrigation until the crop has been very seriously injured by drought, always with the hope that there will be rain the next day. The results of such practice may be seen in the yields that were obtained on four wheat fields in the Coaldale district in 1913. (Diagram exhibited.) These fields are near each other. They had been cropped to grain for several years except field No. 3, which was in potatoes the previous year. Any difference in yield is, without doubt, due to the time, or lack of application, of water by irrigation. In the upper part of the diagram the daily rainfall for April to September is shown, and as you see the drought during the period May 17 to June 17 affected the yield in this way. The first field was irrigated the first week of June and produced 31 bushels per acre. The second irrigated ten days later produced 26 bushels per acre or 5 bushels less. The irrigation of the third was not commenced until the 17th of June, at a time when it had already been very seriously affected

by the drought. It produced only 19 bushels, or only 4 bushels more than the crop that was not irrigated. There is no doubt that had the first field received its irrigation earlier or in the fall previous its yield would have been greater. I wish also to point out that the time of irrigation influences the time of maturity. In this diagram the crop that was irrigated earliest was harvested about the same time as the dry crop, while those that were irrigated later, and had been set back by this drought, matured later. Irrigation does not necessarily delay maturity, for if water be applied properly, at the proper time and in proper amounts, the irrigated crop may in years of early drought mature earlier. This did actually occur last year at the duty of water plots at Strathmore, when several plots of irrigated peas matured about 10 days earlier than the unirrigated. The unirrigated peas suffered from drought in the early stage of this growth, and when rain did come a second growth commenced. The irrigated peas, however, made a more normal growth to maturity.

In some of the States to the south it has been found that if the crop is irrigated during certain stages in the growth of the plant, the yield will be increased. Our experience here seems to indicate that so far as the districts that are now under water are concerned, water should be applied so that our drought periods will not interfere with the normal growth of the plant.

The kind of crop is another factor that has to be considered. It has a bearing upon the amount of water required and the frequency with which it should be applied. Different crops require different amounts of water Alfalfa requires about twice as much water as grain. When alfalfa or other forage crops are grown for seed the water required is considerably less, and when grain is grown for green feed more water may be used than when it is grown for the kernel.

Our investigations during 1913 and 1914 show that the amounts of water applied by the irrigation farmer to a number of fields, under very good farm practice, is a little over 10 inches for grain and about 22 inches for alfalfa. When the rainfall for April to September inclusive is considered, the amount of water applied by rain, plus irrigation, is about 19 inches for grain and 31 inches for alfalfa. These statements are based upon figures obtained by the measurement of water applied under ordinary field conditions in the Coaldale and Strathmore districts. Data collected at the duty of water plots at Strathmore were not used in arriving at these figures, as the work there, though very conclusively showing the value of irrigation for a year like 1914, do not throw much light upon the proper duty of water, because of the lack of uniformity in the soil moisture content of the various plots at the beginning of the season.

These figures, although showing the amount of water actually applied, do not necessarily show the proper duty, as there is no information to show that a greater or less amount may not have produced better results. They do, however, agree very favourably with very reliable data that have been obtained on projects in the United States, where conditions are similar to ours.

The character of the soil and subsoil has a greater influence on the amount of water that the land will take than is usually realized. The loss due to deep

percolation on a porous, sandy and gravelly soil is very great, and it is also very difficult to control, while on our closer soils and on those which have an impervious layer of clay or hard-pan near the surface, the loss may often be reduced to such a degree that it is negligible. But in those open porous soils where the water can readily reach the country's under-drainage, large losses will always occur.

On the closer soils the water is taken in more slowly and it is necessary, at times, to hold the water for a longer period on such soils to secure a proper irrigation. We have found that the application of a two-inch irrigation is possible under certain fields conditions on the closer soils and that a one-foot irrigation can be readily applied to the lighter soils.

The excessive use of water on open soils, when the field ditches are placed too far apart, is very clearly shown in a diagram by Hilgard. When the field ditches are placed too far apart the water may be wasting away into the natural drainage just below the upper ditch before the water on the surface reaches the next lower ditch. In the upper part of the diagram (exhibited) is shown the loss due to deep percolation, when the field ditches are placed too far apart; in the lower part of the diagram, when the ditches are placed closer together, the amount of water taken in is considerably less. The field ditches on close, heavy soils need not, other things being the same, be as close as those for open soils. The distance between field ditches will depend also upon the crop grown, the slope and general topography. In the irrigation of alfalfa and the grasses it may be permissible to place them as much as 250 feet apart, but when irrigating grain the distance should not be more than 150 feet, and ditches as close as 75 feet will often be advisable. Make good sized ditches, well located, and you will find that you can irrigate much easier, much better and more quickly.

I do not think that I can sufficiently emphasize the value of the proper preparation of the surface of the land that is to be irrigated. It is a very discouraging task to those who try to apply water to a piece of land that is full of knolls and hollows, and if it is the irrigator's first experience, his invariable decision is that it is utterly impossible to spread water evenly over the surface of the land. Yet if irrigation is to be most successful this must be done, and a crop cannot come to maturity evenly unless the land receives a uniform wetting. Irrigating rough land is a hard task. It results in reduced yields, causes injury to land, and increases the waste of water. I urge you to prepare your land properly. It will not only save you time and labour at each irrigation, but the uniform wetting that you will be able to apply will result in increased yields. I do not ask you to change the lay of your land. I simply ask you to smooth out the rough spots, most of which can be done by the use of a float or level. This float should be made at least 16 feet long and, for four good horses, 6 or 7 feet wide.

The loss due to surface evaporation is very great. This of course can be reduced considerably by proper methods of surface cultivation, which not only reduces the evaporation, but at the same time produces those soil conditions

which render the plant food of the soil available. It is a mistake to suppose that water alone is necessary to produce good crops. Thorough cultivation is considered necessary in the more humid districts, and it is true to a greater extent in the arid or semi-arid districts where water is applied by irrigation.

The success of the irrigation farmer will depend upon his ability to properly distribute the water upon the land, and upon the judgment he shows in the time he applies that water. Irrigators, like men in any other business, are not equally proficient. There are some that are exceptionally good while others are poor. Those of you who have irrigated know that it requires some skill to properly irrigate a piece of land, and you also know the harm that unattended water will do. Yet there are those who seem of the belief that once water is turned out of the field ditches, it should, as if by magic, spread itself uniformly over the surface of the soil. We find that the water is often permitted to run for hours, and sometimes even days, in the same place. This practice is not only wasteful, but it is decidedly harmful to both crop and soil, and success with irrigation under such conditions could hardly be possible.

All crops do not require the same amount of water; neither do they need this water at the same time. Alfalfa and other forage crops, require more than do the grains and roots, and each require the maximum amount at different times. Then under a single cropping system, especially if that crop be grain, the water that is at your disposal must be applied within but a short period. A cropping system which will require a more constant use of water throughout the irrigation season would not only be more advantageous, but such a system would also spread all the labour required more uniformly over the cropping season. It is not my intention to enter into those other advantages of diversified farming as against a single or speculative cropping system, but I do wish to emphasize the fact that the irrigation farmer should run a diversified farm.

I have not attempted to point out all the factors that influence the amount of water required by irrigation, but I believe that I have taken up those that are of the most importance at the present time.

MR. YOUNG: Mr. Chairman, Ladies and Gentlemen,—There is just one point that I would like to say something upon. I have listened to Mr. Bark and others in their talks on irrigation and I have thought, "What about the nature of the soil and character of the sub-soil." I am not a farmer, although as a boy and going to High school I was called a *"hay-seed."* As I go about and observe what is being done I have thought of it. At one end of the Thomson Valley you can go from a dry farming country into an irrigated country and even in the dry farming country you will find people irrigating, so it seems to me you must know something of the nature of the soil. It occurs to me that Mr. Bark has a definite idea in view and is trying to bring home to you to understand the plant you are growing and then he will come and tell you about the nature of the soil.

MR. WALTERS: I would just as soon have Mr. Bark go into this, but I had this in my speech. On a close soil when you put on the water, the water will naturally stand there and in a few years you are going to bring that water right up to the surface. With an open soil, however, you would not have that trouble although it takes so much longer to irrigate it.

MR. CRANDALL: Mr. Chaiman, Mr. Walters has a float on his chart, but he has given us no information regarding it.

MR. WALTERS: I think this is a better float than Mr. Bark's, but I think I can improve this one. The float should be made narrow. You should pull it the long way. This float is built for about four horses. It is sixteen feet long and from six to seven feet wide. The addition I would put on this float is another piece or length here (illustrating)—another foot, so that when you are going over the knolls you are not pulling with this thing all the time, but you get a little push and collect this dirt. When you go over the lumps it raises the piece here and drops more dirt. The figures for this are, two 2"x12", four 16 feet and a couple of poles and a chain. Pick the stuff up off your farm. It does not cost you anything more than your labour.

MR. FAIRFIELD: Don't you think it best to shoe the cutting board in the centre.

MR. WALTERS: Yes, but most farmers will not shoe the cutting board.

MR. FREYBERGER: If you take it off the back end and you did not need the piece so much, I notice it is better to put it back six feet.

MR. BARK: He hooks it back so as not to let it cut so much more.

MR. FREYBERGER: The only bad feature I see that possibly could come out of all these very excellent addresses we have heard is that they are so elaborate and give one so much to do and we are getting the accumulation of the knowledge and experience of years of these men and they are trying to inject it into a common old plug of a farmer, and get him to understand it. I have an idea that next year when Mr. Bark and Mr. Walters come around and find we are not doing these things just right, they will rake us over the coals and say "Didn't we tell you how to do that at the Convention." We have heard a lot about the proper time to irrigate and how much water to use. These things are very essential, but they have not made it clear and it is not possible to tell a man, or to tell me to-day, when it is the right time to irrigate next year and there is only one rule that the average farmer can go by and that is this,—when he goes out to his farm and it begins to look dry it is a mighty good time to irrigate and do it after you have prepared the land the best you can and you cannot prepare it too well. However, in this district, we do not have much use for a Fresno scraper, but after you have prepared the land as best you can with your own experience or the experience of the people paid to help you, use just as much water as you can get over your land as quickly

as you can and you have done it just about right, and use as big a head as you can get. There is nothing so intricate about irrigation but that any man with ordinary intelligence can understand, and I for one, who have had ten or twelve years experience know that with a little help from some one who knows, you can start and the whole thing will be unravelled to you and first thing you know you will be an experienced irrigator.

CHAIRMAN: I would like to make an observation in regard to what the last speaker has said. We hope to get publications out before you start irrigating next spring and then you can study just what will be of most advantage to you. Before calling on the next speaker, I understand that Mr. Travis desires to make an announcement.

MR. TRAVIS: We give a very hearty invitation to all accredited delegates to a banquet at the Berkeley Hotel, and we wish you to bring your wives along with you. In case anybody has been overlooked as to invitation, I wish it would be brought to my attention and I will have an invitation given.

Mrs. Harry Pattin, of Bassano, a First Prize Winner.

CHAIRMAN: We will now have an address from Mr. W. E. Scott, Deputy Minister of Agriculture, Victoria. (Applause).

MR. SCOTT: Mr. Chairman, Ladies and Gentlemen,—It has been a very great pleasure to me to have had this opportunity of attending this Convention of the Western Canada Irrigation Association, and to listen to the many discussions which have taken place, and hear the capable addresses which have been delivered by men who are so well qualified to speak on the subjects which they have chosen.

I think you will agree with me that this has proved the most successful Convention that your Association has yet held, both in point of interest shown, and attendance. It surely augurs well for the first industry of Canada—that of agriculture—when so many interested farmers gather together for a discussion of matters of mutual interest, and of the many problems which confront the farmer to-day, with the idea of elucidating and solving, if possible, these difficulties, and thereby enabling the farmer to secure the best results for the time, energy, and money, which he has expended in his business.

I assure you that I appreciate very much the honour that has been conferred on me by the Association in inviting me to address this important Convention. Any matter affecting agriculture is naturally of the greatest interest to me in my position as executive head of our Provincial Department of Agriculture.

With your permission, I would like to change the title of my address, which is down on your programme as "Agricultural Opportunities in British Columbia" and to widen a little the scope of my talk, to include Agricultural Conditions throughout Western Canada.

Before I left Victoria, realizing the importance of this Convention, I prepared an address. It was my intention to read it at this Convention, but I would much prefer—though I am no orator—to speak to you off-hand, as one farmer to another.

Before I came into the position which I now hold, I had been engaged in farming all my life, since I was eighteen years of age. I farmed in New Zealand for six years, and over twenty years in our province.

VOICE: (Mr. Rankin)—You do not look that old.

MR. SCOTT—Thanks, Mr. Rankin, that is very nice of you.

So possibly I may know a little about of what I am going to speak. When I started to farm, the educative opportunities which are available at the present-day were non-existent. I never had the advantage of attending an agricultural college, and the little that I have learned about farming is by going through the mill, being up against different problems, and having to find the solution for them myself.

It is needless for me to say that I never amassed a fortune at farming, but for twenty-six years I may safely say that I made a good living out of it, and these years were amongst the happiest in my life. (Applause).

This address which I have discarded is the usual sort of paper, with nicely rounded phrases and quite a number of platitudes, but I think that this is not exactly what you farmers want to hear, so if you will excuse any errors in diction, etc., I will speak in an impromptu manner.

This is an irrigation meeting, and it is only proper that matters of irrigation should receive the first attention. I have never farmed under irrigation myself, but naturally have a superficial knowledge of the matter. We have many irrigation projects in British Columbia, and many of our districts have

Some of the Prize Winners at the Convention.

developed along irrigation lines. In all districts in the province, with a rainfall of say fifteen inches downward, irrigation is practised if water is available, and I am quite satisfied in my mind that, with a lesser amount of rainfall than this, you cannot get the best crops unless you have water available to turn on the land when necessary.

I was much interested in some discussions that have taken place in this Convention, with regard to conditions at Gleichen, and some gentlemen have stated that they have not been able to get satisfactory results from the use of water in this district. I am inclined to think that the reason that they have not got good results is that the right methods have not been adopted, and probably, if some demonstration work were carried out along irrigation lines, you will find that better results can be obtained when the correct methods have been discovered.

Irrigation undoubtedly is an insurance for crops, and in districts with a light rainfall, is absolutely necessary if the maximum returns are to be secured.

There is one point which probably is not sufficiently emphasized at irrigation conventions. Plenty is said about the use of water, but there is not quite enough said about the abuse of it. In the fruit districts of our province many thousands of trees have undoubtedly been killed by the abuse of water. When irrigation was first started in many of our fruit districts, orchardists seemed to think that the more water they turned on the land, the better it would be for the trees, but they have now found out that they were wrong, and that excessive water is most detrimental.

The use of too much water has resulted in engendering fire blight in some of our fruit districts. This is the worst disease that can affect fruit trees, and it has killed off many thousands of trees in our province. Our Provincial Government has had to take a hand in the matter, and we have endeavoured to suppress this blight, and with marked success, but the point that we have had to strongly emphasize to growers is that excessive use of water puts the trees in the right condition for the spread of this disease, and that the first thing they must do is to use intelligence as to the amount of water they put on their land.

We have also in our province many dry farming districts where farmers are getting fairly good results by following correct dry-farming methods, but the districts where this is followed are places where, for one cause or another, it is not possible to secure water for irrigation purposes.

I would like to heartily congratulate you farmers of the Prairie provinces on the really magnificent crops of grain which you have secured this year. You have indeed just cause for your optimism. I always thought that the farther west one goes, the greater optimist one becomes. We do not think that we are far behind in this matter in our province, but I think that you can beat us. I had the privilege of acting as one of the judges of your exhibits, and was surprised at the general excellence of what was shown. The only fault was that you did not exhibit more. The quality was all right, the quantity was at fault.

I was discussing the question of strawberry growing in our province with a gentleman the other day, and he was mentioning the splendid strawberries which are grown in Alberta. I casually mentioned to him that I had seen strawberries in our province which would not go into an ordinary sized tumbler. He remarked to me that that was nothing, and stated that he had seen strawberries grown in the province of Alberta that were six inches in diameter. I then gave it up; it was no good my going any further. That is what I call rosy optimism. (Laughter and applause).

I hope that the splendid crop of grain which has been more or less universal throughout the Prairie provinces may not prove to be an evil in disguise. You will excuse my plain talking. As I come from British Columbia, I can talk more freely here than I could in my own province. I hope it will not encourage you farmers to continue on what I might call the downward road of straight grain-growing. It appears to me that there is too much tendency for newcomers in this fine province of yours to engage in exclusive grain-growing. You have one of the finest tracts of country in the world, and some of the finest agricultural lands in our Dominion of Canada, and your country is pre-eminently adapted to not only growing grain crops but also to mixed farming.

Settlers who come to the Prairie provinces naturally want to get rich as quickly as possible, and are rather too much inclined to stake all in grain on a gamble for a good crop with high prices. A year will come when you will get a low yield, and low prices, and you will then probably regret that you did not start in on mixed farming lines in addition to grain production.

I am of course aware that many of you farmers are keeping plenty of stock on your places, and generally conducting mixed farming operations, and these remarks which I have had the temerity to make do not, of course, apply to you but only to those who are devoting all their land to grain.

Much has been said at this Convention about the necessity for encouraging diversified farming, and it is almost superfluous for me to say any more on it. Judging from the quality of the exhibits which you have here, I am safe in stating that you can grow most of the necessary fodder crops for stock purposes, and I am sure that you will get good results from the keeping of different kinds of stock on your places and breeding up from selection.

Don't you think it would be wiser for a man with, say three hundred acres, to devote a certain part of his land to grain-growing and the rest to growing alfalfa and other fodder crops, roots, vegetables, etc., for stock food purposes so that if you have a bad year with low prices for grain, you have something else on which you can live.

May I point out to you in a few words a contrast, or two pictures,—one mixed farming, and the other straight grain-growing? We will imagine that in ten years' time from now, I re-visit Bassano. The object of my visit is to inquire into the co-operative farm settlements, about which I had heard so much. I get off the train at Bassano, and find a prosperous town, nicely laid out with shade and ornamental trees planted out on the streets. I get into a rig and drive out to see one of your co-operative irrigation settlements. After

driving a few miles along a well-kept road, I come to a settlement. I observe a good school, church, and substantial buildings, with shade trees planted round about the homesteads, nice lawns, and beds of flowers surrounding neatly painted houses. I stop at one of these homes, and see the owner of the farm coming out of the gate of his yard. I say 'Good day' and start talking to him, and he, as is always the case in Western Canada, holds out the good hand of Western Canadian hospitality. He makes me welcome, and asks me to stop and look about the place. I get out of my rig and go with him to see his buildings and stock. I inquire how he is getting along, and he seems to be contented and happy.

We cross the yard, go into the cow-shed, and see half a dozen good, well-bred Ayrshire cattle standing in their stalls. We discuss the different points of his cows, and you can see that he takes a keen interest in all his stock, and that his work is a pleasure to him. We then have a talk re feed rations and fodder crops, and, leaving the cattle-shed, go into the yard to look over his hogs. We see some well-bred Yorkshire sows, with good litters of pigs, and fattening pigs in another pen. After having duly admired these, we go over to see his poultry-house where he has a good flock of well-bred White Wyandottes from which he is evidently getting satisfactory returns.

Crossing back to the house, we notice in an adjacent field a flock of good sheep. After having had a good talk on various agricultural matters, he invites me into the house to dinner. I am introduced to his good wife, and we sit down. There is a nice snowy tablecloth on the table on which is set out butter made on the ranch, eggs from the poultry house, vegetables from the garden, and cream from his dairy cows. A meal fit for a king.

Afterwards, we go out and walk round about his garden and admire the flowers, and generally, I have a good time with him, discussing matters of mutual interest. We finally sit down on the verandah, smoke our pipes, and admire the magnificent view in the west. We see the golden streamers where the sun is sinking over the Rockies, and a feeling of contentment comes over one—a feeling that farming away from the streets and turmoil of city life, is the best life, after all. Later, I get into my rig to drive back into town, and everything looks bright and pleasing to the eye.

Now, for the other side of the question—straight grain-growing. Some days later, I am going through another district, and as I drive along, I come to a scattered settlement. I drive up to a house, and see the owner coming in from cutting a field of wheat. He, like the other, welcomes me in a hospitable manner. I begin to question him about his crop, and ask him how things are going. He seems discouraged, says his crop is a light one, and that the prices are low, and that he does not think he will come out square.

He invites me into the house, and we sit down to dinner. On the table are tinned meat, a pork from Chicago, butter from New Zealand, eggs from Ontario, vegetables from British Columbia, and condensed milk from Washington. After dinner he excuses himself and hurries out to finish his cutting. In walking out of the house, I observe that there is no garden, a lot of tin

cans, empty packing boxes and farm implements are scattered about the place, but nothing to please the eye.

I get into my rig and drive away, and see the same sun sinking towards the foot-hills of the Rockies, but somehow the sun does not seem to shine so brightly as I drive back to town, and I have a depressed feeling. Such is the influence of environment.

The first was a home, and the second was not. This is the point that I want to work up to—that the first consideration is the home aspect. The home should be considered first of all, and it is only by following mixed farming that such homes can be established.

In driving round the district the other day, I had the opportunity of seeing many settlements, and I noticed that most of your houses were quite innocent of paint or whitewash, and I wondered why this was so. Do you not think that the country would look more attractive if your houses were painted or whitewashed? If you had shade and ornamental trees planted out?—and there are many shade trees that will grow very well in your province. Why not, then, plant them out and make your homes a little more attractive? You will, I am sure, take my criticisms in the right spirit. I know that you will say that you are in a new country, and that these things will come later, but I think that the sooner one makes a start, the better.

I was very much interested in the address given by the Hon. Duncan Marshall, Minister of Agriculture for Alberta, on, "How to Keep the Boy on the Farm." If I were asked to give my opinion as to the principal reason why difficulty was experienced in keeping our boys on the farm, I would say that the chief drawback—and I speak with feeling in this matter—is that you are making the life of the boy on the farm too much of a drudgery.

When I first went to farm in New Zealand, as a boy, I worked for my board, and they certainly got my board out of me. I had to get up at half past five in the morning, go out to the stable, feed, water, and clean a team of horses. When I had done that, I had to sit down and milk as many as ten cows. After that, I would get breakfast. Then, there would be the general work of the day—say ploughing, when one would have to be between the stilts of a plough for eight hours. At six o'clock, the horses would have to be cleaned up, fed, and bedded down for the night. Then, one had to sit down and milk those same old ten cows again, take the milk to the separator house, turn the separator, wash up the pans, and then one was quite ready to go to bed. The same thing happened on Sundays as on week days.

Now, if you make your boys work like that, you will drive them off the farm. Of course, I know that we are getting more enlightened in these days, and that I am giving you an extreme illustration.

Youth craves excitement and healthy exercise, and you must give your boy a chance for play as well as work. There is also a great deal in what Mr. Marshall said, and others have touched upon it—and that is, that if you want to keep your boy on the farm, you must interest him in the work.

I know of several instances in our province where boys have grown up and stayed on the farm, and you cannot drive them away from it. In most instances which I have investigated, I have found that this has resulted from giving the boys an interest in the work. Give them a piece of ground. Show them how to grow, say potatoes, and let them take the crop for themselves. Give them a pig or two, a heifer, or some poultry, and let them run them themselves, and when they are sold, be sure that you do not put the proceeds in your own pocket. Give the boy a show.

Then, there is the question of education for the boys. I am a strong admirer of what you have done in your province of Alberta by way of farm schools. They are practical and efficient, and I think are run along correct lines, and I would very much like to see some similar line of work conducted in our province. They are, above all, practical, and if you take a boy, and show him how to do different kinds of farm work, after a short time he will be able to go back to the farm and give his father some pointers.

Now, I am sure, at the end of a Convention like this, most of you must be getting wearied of addresses and I will not delay you much longer. I will just touch upon one or two further points as quickly as I can, the first of which is the question of co-operation.

This has always been a pet hobby of mine, as I realize that the lack of co-operation is probably one of the greatest drawbacks with which the farmer has to contend at the present time. It is a common saying, but a very true one, that successful co-operation amongst farmers has only been accomplished upon the ashes of failure. I hope, however, that this will not be said of us in Canada, and that we will, before it is too late, come together for the protection of our mutual interests.

I would, first of all, like to say that I am quite aware of the good work along co-operative lines which has been done in the provinces of the Middle West, and also in British Columbia, by means of associations like the United Farmers of Alberta, the Grain Growers of Saskatchewan, creameries, fruit associations, and by other methods, but I would like to ask you farmers this: Do you really think that you are getting the price for your produce at the present time that you should get? The situation appears to be as follows: On the one hand, you have got a body of men—the farmers—acting along individual lines, and with no cohesion; on the other hand, you have the consumer, similarly disorganized; in between, you have the wholesaler and retailer, who are perfectly organized, and working along sound business lines. This middle body is controlling the situation. They say to you farmers—I want this, and this is the price I will pay you. They then turn around to the consumer—This is the price for which I will sell this produce to you. And you may be sure that there is a pretty big gap in between.

Now, this gap has got to be bridged, and how are you going to do it? There is only one way, and that is, by effective co-operation along sound business lines. I hold no brief for the middleman or retailer, but I do know that

farmers will never come into their own till they are in a position to fight these men with their own weapons.

I know of many instances where profits of from 100 to 200 per cent are made by those who are marketing and distributing your produce. How are you going to remedy this? You have got to come together, sink all rivalries and jealousies, and act as one unit, and until you do so, you are not going to get the results you should. United you stand divided you fall.

The farmer, as a rule, is not a good business man. Some of you are, but the majority are not. After all, the duty of the farmer is to produce the articles of the farm at the lowest cost possible, and have them ready for the market. There his duty should end. The marketing of the produce should be undertaken by the best business brains you can buy. The individual farmer naturally cannot afford to get a man to sell his produce for him, but if five thousand, ten thousand, or fifteen thousand farmers act together, they are able to pay for good business brains to sell their produce for them.

The farmer can produce the goods all right. The difficulty has been selling them at profitable prices, and you farmers will never get hold of the end of the stick that rightly belongs to you until you come together and act in unison.

I would like to talk longer on this subject, but it is quite impossible, without taking up too much of the time of this Convention. (Applause).

The farm is like a manufacturing plant. By means of it, the raw material is turned off as a finished product. In this province of Alberta, you have splendid opportunities for mixed farming, and I have observed with pleasure that in the last few years, your country has largely developed along these lines, but there is plenty of room for further development. We must, of course, realize that these Prairie provinces are, as they have been called, the granary of the Empire, and that they will have to continue to produce grain in large quantities, because our Empire is looking more and more to you for the grain that is required to feed the teeming populations of the old lands, but in addition to exploiting your grain-growing, there is no reason why with the natural advantages you possess you should not also be a great diversified farming country.

May I add my recommendation to those that have been given by many prominent agriculturists in your midst, and which has been strongly emphasized at this Convention—Keep more and better stock on your farms, grow a larger quantity of alfalfa and forage plants for feeding to this stock, and in so far as possible, make your farm self-supporting. Let your produce walk off the farm to the market in the way of fattened stock, instead of being sold as hay and grain.

A great deal has been said at this Convention about alfalfa growing, and about the difficulty of marketing it at a satisfactory price. The trouble with farmers is that when the price of any commodity is high, they all rush in and grow it. The safest way is to keep an even average, to conduct your farm operations year by year in the usual way, keep the same amount of stock, grow

the same amount of potatoes, grain, vegetables and fodder crops year by year, and you will find that, taking one year with another, things will even up all right, and keep a good balance.

I am not an advocate of specialization in any one phase of agriculture. I consider that for the average man, mixed farming is infinitely safer, and in the long run more profitable. There is one man in a hundred a trained specialist, but it is far better for the average farmer to engage in mixed and diversified farming.

Now with regard to agricultural conditions in our province of British Columbia. It is not my intention to say much on this subject, as most of you people are acquainted with the conditions which prevail in our province. They are totally different to yours. British Columbia is essentially a place of homes and farms on small acreage—what I might call intensified diversified farming. There are many farmers who are securing excellent results on acreage ranging from thirty to fifty acres of ground. Many people contiguous to our cities are farming on even less acreage than this, but I do not think it wise to encourage men to farm a less acreage than mentioned in our province. There are a few men who, owing to their special knowledge, will make good on a few acres of ground, but the average man will not.

When you leave this province to go into British Columbia by way of the Crowsnest Pass, you come into the Kootenay district, of which my old friend, Mr. James Johnstone, has painted the glories in such a capable manner, that it will be quite needless for me to recapitulate. Leaving the Kootenay, and proceeding west, one gets into the Boundary and Kettle Valley districts. In this part of the province, a certain amount of fruit growing is practised, but the majority of the farming is along mixed farming and stock raising lines. There are several good irrigation projects, and people are getting good results where they have water available.

Further north from the Boundary, is the Okanagan and Arrow Lakes country. The Okanagan is, as you are aware, the greatest fruit producing district of the province. This year, there will be shipped out of the Okanagan Valley nearly two thousand carloads of fruit. Considering that the commercial fruit industry in this section is only about fifteen years old, this is a very satisfactory showing.

North from the Okanagan is the Shuswap country, which is also a good fruit district, as well as suitable for dairying, stock raising and general mixed farming.

Proceeding west along the line of the C.P.R., we come to what is probably the greatest dry farming and stock raising part of the province, viz., the Thompson, Lillooet, and Chilotin districts, where the nutritious bunch grass holds sway, and where some of the finest stock in the province is produced. Some good irrigation projects have also been developed with the best results. I am very glad that, owing to the fact of the next Convention being held at Kamloops, you will have an opportunity of seeing the Thompson Valley. You will be able to see what can be done in the way of growing alfalfa. I saw, early this

fall, a field of alfalfa in the Thompson Valley cut for the fourth time, and the owner told me that his yield per acre would be as much as nine tons of alfalfa. I have seen other fields that will fully average this, that have been down in alfalfa for twenty years.

When I came to the province, twenty-five years ago it was common talk that the land in this district was absolutely useless, except for ranging horses and cattle. To see it now, since irrigation has been developed, a wonderful change has been made, and to use a common saying, irrigation has "caused the desert to bloom and blossom like the rose."

One sees many fine homes with alfalfa and other crops growing luxuriantly, and fruit trees laden with luscious fruits, and I think that those people who say that as good results can be got where there is a rainfall of fifteen inches or under, from dry-farming methods, are mistaken. Irrigation has worked a revelation in the way of crop production in many districts of our province, and I am sure it will do the same here.

Leaving the Thompson Valley, and proceeding west along the line of the C.P.R., we come into what is called the Lower Mainland country, comprising the delta of the Fraser Valley. Probably nowhere in Canada is there land of greater richness than the country contiguous to the Fraser river in this district. It is somewhat similar to the delta of the Nile. There is a record of 183 bushels of oats to the acre in this district, and of 97 bushels of wheat. It is a district in which clover and other grasses grow luxuriantly, and is preeminently adapted for dairying purposes. You will see some of the finest herds of Holstein, Jersey, and Guernsey cattle in the Dominion of Canada in this section.

Vancouver is the Pacific terminus of the Canadian Pacific Railway, and is a city which is destined to become a large commercial centre, and one of the biggest cities on the Pacific slope. Leaving Vancouver by the luxurious boats of the Canadian Pacific Railway, a short run brings us to Victoria, the capital of the province, on Vancouver Island. Victoria is generally known as "Victoria, the Beautiful" and well merits this title.

North of Victoria are many districts which are very sutiable for general mixed farming purposes, and which have been somewhat extensively settled.

This is a short description of the principal farming district of southern British Columbia.

Farther north, there are some very large tracts of farming lands. Central British Columbia is that part of the province recently opened up, and developed by the completion of the Grand Trunk Pacific railway.

Between Hazelton and Fort George, there are millions of acres of fine agricultural land, that can be cleared at a low cost. The timber on the land is a light growth of poplar and willow, and occasionally spruce, and a large proportion of this land can be cleared at prices ranging from $10.00 to $50.00 per acre. This will eventually prove to be one of the greatest stock-raising and mixed farming districts of the province.

North of this, we also have large areas of land in the Peace River country access to which will be given from the Pacific coast by the line of the Pacific Great Eastern now in course of construction.

In conclusion, Mr. Chairman, may I say a few words on the question of inter-provincial trade, and incidentally make an appeal to you people of the Prairie provinces on behalf of reciprocity in trade between your country and our province of British Columbia. Our interests are closely interwoven, and in a way we cannot very well do without each other.

At the present time, a great economic wastage is taking place in our province. We sent out in the year 1914 nearly $25,000,000 to foreign countries and other provinces of the Dominion for agricultural produce practically all of which can be raised to the best advantage in the Dominion of Canada. From advance figures collected by our Statistical Branch, I am able to say that our importations this year show a very material reduction, which shows that we are beginning to realize that it is up to us to produce for our own requirements.

In the past few years, we have all been too much imbued with the spirit of real estate speculation. We bought and sold land with no thought for the morrow. The inevitable crash came, and conditions now are very different to what they were a few years ago.

Our urban development had preceded, not followed as it should have done our rural development. Now it is up to us to develop as quickly as possible agriculture in our province, and as we do so, our cities will legitimately grow. We have seen our mistakes of the past, and are now endeavouring to remedy them.

You people of the Prairie provinces have done the same thing and are suffering from the same causes. It is no use, however, crying over spilt milk. What we have got to do is to get down to business and correct the mistakes of the past.

In our province this year, grain production has increased by about 50 per cent. There is very little grain grown for sale in British Columbia. It is grown and fed to stock, or as a forage food. We look to the people of the Prairie provinces to sell us grain and mill feeds. Last year, we imported $12,000,000 worth of meat, butter, eggs, and mill feed. On the other hand, we send you our fruit, vegetables, lumber, etc. Now, don't you think that it is in the interests of both our provinces to encourage as much as possible inter-provincial trade? Why should you in the Prairie provinces send to Washington for fruits and vegetables? Why should we in British Columbia send to Washington for hay or grain? You can get better fruit from British Columbia than you can from Washington. When you spend $1.50 for a box of apples coming from Washington, that money is lost to the Dominion of Canada. When you buy a box of apples for $1.50 from British Columbia, the money is kept in circulation in the Dominion, and everyone benefits.

If we could eliminate our foreign imports, and keep the money circulating in the Dominion, it would mean better times all round. I would ask you,

therefore, when you are buying fruit or vegetables, to give our province the preference, everything else being equal, as regards price and quality. Let us both endeavour to develop inter-provincial trade in every way we can.

Now, Mr. Chairman, I must apologize to you and this Convention for taking up so much of its time. If I had read the paper I had prepared, you would certainly have had a more finished address, but I do not think that you would have appreciated it very much.

The points that I want to emphasize are:

1. Get more and more into diversified farming.
2. Keep more and better stock on your places.
3. Try and feature the home aspect of your farm life.
4. Act in unison along sound business co-operative lines.
5. By proper and considerate treatment keep your boy on the farm.
6. Increase your production. Our Empire expects you to do so.
7. Knowledge is power. Increase therefore your knowledge and invoke the aid of science in your farming operations.

I thank you for your kind attention. (Applause).

MR. BARK: I have explained how to get into alfalfa, clover and other pasture grasses and it is just as easy to get into pigs and poultry and other stocks. It is a lot easier to start out with a couple of old sows. If you keep your calves and the female colts it will surprise you how quickly you will get into diversified farming.

MR. PETERS: Mr. Chairman, Ladies and Gentlemen,—There was a question that came up before the Executive regarding certain changes in the Constitution of the Association, namely, the basis of representation. Mr. Young and myself were delegated to look into this and we made a report to the Executive which was confirmed and I was instructed by our Chairman to give notice at this time that at the next annual meeting, these amendments will be brought before the meeting. The motion will be to add two new paragraphs to the membership as follows: The Controller of Water Rights of British Columbia and one delegate from the Water Rights Branch of the Department of Lands. Another paragraph; The Chief Engineer of the British Columbia Hydrographic Survey; and, also, in a certain paragraph which mentions the names of the Dominion Superintendent of Forestry and the Chief Superintendent of Forestry, to add to that the Chief Superintendent of the Dominion Water Power Branch. This motion will be brought up at the next annual meeting.

CHAIRMAN: The Secretary has some letters that he wishes to read.

SECRETARY: I have received the following letters from some of those who have been unable to be with us.

(TELEGRAM)

Calgary, Alta., Nov. 23, 1915.

Irrigation Convention,
Bassano, Alta.

Regret that I am not able to be with you.

A. D. Campbell.

"Regina, Sask., November 18th, 1915.

Secretary, International Irrigation Convention,
Calgary, Alta.

Dear Mr. Rankin,—With reference to your message of even date, I regret very much that the other calls on my time will not permit me to be with you at your Convention next week, much as I should like to. I have to be in Regina next week for several meetings and conferences.

However, I have made arrangements for Mr. Domaille, our Acting Weed Commissioner, to attend the Convention at Bassano as a representative of this Department.

Trusting you will have a very successful gathering and regretting my inability to attend in person, I am,

Yours very truly,
(Signed) W. R. Motherwell."

"Bassano, 24th Nov., 1915.

Secretary: Bassano.

Dear Sir,—It is with extreme regret that I find myself forced to leave Bassano before the completion of the Convention, owing to a prior engagement. I had hoped that at the banquet an opportunity would have been afforded me to express, in my halting way, on behalf of the Saskatchewan delegates and myself, our appreciation of the kindness and consideration shown both to ourselves and our exhibits by the Officers and Members of your Association.

Please convey to them our thanks, together with my own personal apologies and excuses for not being able to accept your invitation to the banquet.

Believe me, dear Mr. Rankin,

Yours very sincerely,
(Signed) Thomas Domaille,
Provincial Representative for Saskatchewan.

"1161 Granville St., Vancouver, B.C., Nov. 20, 1915.

Secretary, Western Canada Irrigation Association,
Bassano, Alta.

Dear Sir,—I feel very much "out of it" this year, in not being able to take part in the Bassano Convention, but as you know, circumstances will not permit.

Kindly convey to the Executive, Local Board of Trade, and Members, my regrets at not being able to be with them this year, and wishing you all kinds of success for a record Convention, I am,

Yours very sincerely,
(Signed) Chas. W. Dickson,
First Vice-President."

"Victoria, October 25, 1915.

Secretary, Western Canada Irrigation Association,
Calgary, Alta.

Dear Mr. Rankin,—I am in receipt of your letter of the 22nd of October and note what you say with reference to the Annual Convention which is being held at Bassano in November. I regret very much that my engagements will make it impossible for me to attend the Convention on the dates mentioned, but will be glad to arrange for Mr. Young to be present.

Hoping your Convention will meet with every success, I am,

Yours very truly,

(Signed) Wm. R. Ross,
Minister of Lands."

"Ottawa, October 22, 1915.

Dear Sir,—I find that it will be quite impossible for me to attend the Convention of the Western Canada Irrigation Association at Bassano on the 23rd November, next. I very much regret this, but find that my numerous and lengthy absences from Ottawa during the past season have resulted in a considerable accumulation of work which it is absolutely necessary for me to attend to.

The programme which you forwarded to me a day or two ago indicates that you will have a fine array of speakers and the subjects for discussion seem to be particularly well-chosen. I trust that you may have a large attendance and that the Convention may prove, as it should, the best in the history of the organization.

Although I shall be unable to attend personally, it has been decided that Mr. W. M. Bailey, Assistant Superintendent of Irrigation will attend, although I believe Mr. Bailey would prefer not to take any prominent part in the discussions. I will very much appreciate anything you can do to make Mr. Bailey's first visit to the West valuable to him.

Yours very truly,

(Signed) E. F. Drake,
Superintendent of Irrigation

Secretary, Western Canada Irrigation Association,
P. O. Box 1317,
Calgary, Alberta."

"Penticton, B.C., November 20th, 1915.

Secretary:
Bassano, Alta.

Dear Sir,—I regret that I find it impossible to be with you at your Convention in Bassano this year. I am deeply sensible of the usefulness of the Western Canada Irrigation Association and can only wish that conditions would have permitted of my being present.

With best wishes for a successful Convention, I remain,

Yours very truly,
(Signed) Edgar W. Dynes,
Secretary."

EWD—D.

"Victoria, Oct. 19th, 1915.

Secretary, Western Canada Irrigation Association,

Department of Natural Resources,

Calgary, Alta.

Dear Sir,—I regret very much that under all conditions, it will not be possible for me to attend the Convention at Bassano, especially as it will prevent my addressing the Convention on the "Marketing of British Columbia Fruit in the Prairies."

As Mr. Scott has definitely undertaken to be present, I have discussed the matter with him and I would suggest that you accord him a place on the programme on the subject suggested to me, namely, "Getting British Columbia Fruit to the Prairie Farmer," or some similar subject.

Yours very truly,

(Signed) R. M. Winslow,
Horticulturist."

"Larchmount Farm, Pambrun, Sask., Nov. 9th, 1915.

Dear Sir,—Kindly convey my thanks to your Association for its generous feeling in regards to my exhibits.

I will try to make a showing at Bassano, but having had to purchase a small threshing outfit to thresh my pure grains which are in stack, I cannot make a definite promise, but will do my best.

I may place a small collection of grains on exhibition.

Again thanking you for kindly interest, I am,

Yours,

(Signed) Wm. S. Simpson.'"

"Hermiston, Oregon, Nov. 16, 1915.

Dear Friend Rankin,—I regret very much to write you of my inability to attend the meeting of the Western Canada Irrigation Association at Bassano, Nov. 23rd, 24th and 25th. The fact of the matter is that my wife, my daughter and myself are all down with the grip. I should be leaving here not later than next Sunday and that is now entirely out of the question.

I had planned a whole lot on this meeting and am deeply disappointed over the situation. If the invitation is still open to me next year I shall make another effort to come.

Wishing you success with the Convention and with kind regards to all my friends and acquaintances there, I remain,

Yours truly,

(Signed) J. T. Hinkle."

"Nov. 20th, 1915.

Secretary, Western Canada Irrigation Association,
City.

Dear Sir,—I beg to acknowledge with thanks, receipt of your favour of Nov. 16th, enclosing three certificates of appointments for delegates to the Western Canada Irrigation Association Convention.

I deeply regret the fact that I shall be unable to take advantage of your kind offer and be in attendance in person, but I am enclosing two certificates which if you would kindly see that they are presented to the proper parties, you will much oblige.

Trusting that this Convention will be the successful one that others of a like nature have been in the past, I am,

Yours truly,
(Signed) M. C. Costello,
Mayor."

"Regina, 4th November, 1915.

Dear Sir,—I greatly regret to find that the work requiring attention by myself and some imperative appointments make it impossible for me to attend the Convention of the Western Canada Irrigation Association at Bassano on November 23rd-25th next. Attendance at two California Congresses kept me away from the office most of September and I had hardly arrived home when I got a summons to Ottawa to attend a conference there regarding disabled soldiers. The two absences have resulted in an accumulation of work which will preclude my attendance at your Convention which I regret very much. I sincerely hope the Convention may be both very successful and interesting.

Believe me,

Yours very sincerely,
(Signed) Walter Scott.

Secretary, Western Canada Irrigation Association,
Calgary, Alberta."

"Victoria, 27th Oct., 1915

Secretary, Western Canada Irrigation Association,
P. O. Box 1317,
Calgary, Alta.

Dear Sir,—I beg to acknowledge receipt of your communication of the 19th inst., extending me an invitation to be present at your Ninth Annual Convention to be held at Bassano on November 23rd.

I regret to say that owing to my other engagements it will be impossible for me to be present with you on that occasion but I hope that you will have a very satisfactory meeting.

I will be glad to forward you a photograph a little later on if I can find one that I think is suitable.

Yours truly,
(Signed) N. J. Bowser,
Minister of Agriculture."

"Ottawa, October 27, 1915.

Dear Sir,—I am just in receipt of the official call for the Ninth Annual Convention of the Western Canada Irrigation Association, to be held at Bassano, Alberta, November 23rd, 24th and 25th.

Owing to previous engagements, it will be impossible for me to attend the Convention, but I am arranging to have a representative of the Dominion Water Power Branch present, also a delegate from the British Columbia Hydrographic Survey and the Manitoba Hydrographic Survey.

Hoping that your Ninth Convention will be as interesting and instructive as the previous ones, I am,

Yours faithfully,
Dominion Water Power Branch,
(Signed) J. B. Challies,
Superintendent.

Permanent Secretary,
Western Canada Irrigation Association,
Box 1317,
Calgary, Alberta."

"Forestry Branch, Ottawa, October 15, 1915.

Dear Sir,—I have just got back to Ottawa and find your letter of the 22nd ultimo inviting me to attend the Convention of the Western Canada Irrigation Association at Bassano in November, and regret very much that it will not be possible for me to get out West again this year. I have always enjoyed the Conventions of the Association and would like to have been able to attend this year.

Wishing you all success,

Yours faithfully,
(Signed) R. H. Campbell.

Secretary, Western Canada Irrigation Association,
Calgary, Alberta."

" British Columbia Fruit Lands, Limited.
Kamloops, B. C., Nov. 17th, 1915.

C. E. Lawrence, Esq.,
President, Kamloops District Farmers' Institute,
Silent Pool Branch,
Kamloops, B. C.

Dear Sir,—I beg to acknowledge receipt of your letter of 13th inst.

I am afraid it will be impossible for me to attend the Convention at Bassano—I am expecting the new manager of Cherry Creek here any day now and also expect a shipment of cattle to arrive in a few days and could not possibly therefore absent myself till the new manager is settled and the cattle expected are put away for the winter.

Nevertheless, I appreciate very much your kind invitation to be a representative of this District.

Yours truly,
(Signed) Meighan,
Director."

"The Park Ranch,
Coaldale, Alberta, Nov. 12, 1915.

Secretary, Western Canada Irrigation Association,
Box 1317, Calgary, Alberta.

Dear Sir,—Your letter 3rd inst. received and I thank you for the kind invitation extended, but as I have not yet been able to get my threshing done it will be impossible for me to attend. I am sure the farmers will all appreciate your having the Convention late in the season for their benefit, and I for one am very sorry indeed not to be able to attend. I believe the programme as arranged will prove to be the most interesting and instructive that has yet been presented by the Association.

Again thanking you for the cordial invitation, I remain,

Very truly yours,
(Signed) W. H. Pawson, Jr."

"Department of the Interior
United States Reclamation Service.
Billings, Montana, November 16, 1915.

Dear Sir,—Your letter of October 30, 1915, in which you request of Mr. I. D. O'Donnell, Supervisor of Irrigation, that he forward to you a copy of his address "Better Farming" for your convenience in getting off an early report of your Convention.

Mr O'Donnell has been called to Denver, Colorado, on important business and it is improbable that he will be able to conclude his work there in time to reach Bassano by Tuesday, November 23rd. Before leaving for Denver he requested me to forward to you a copy of his address, which I am doing herewith.

Mr. O'Donnell is much interested in your Convention and has planned to attend. The call to come to Denver was unexpected, however, and will make his attendance impracticable.

Very truly yours,
(Signed) Robt. C. Elting,
Chief Clerk.

Permanent Secretary,
Western Canadian Irrigation Association,
Calgary, Alta., Canada."

"The Taber Irrigation District
Taber, Alta., Nov. 20th, 1915.

Secretary, Western Canada Irrigation Association,
Calgary, Alta.

Dear Sir,—I have your letter of the 8th inst., and thank you for the invitation to our directors to attend the Convention at Bassano. Mr. Sundal is attending the Claresholm School, and I found that the letter addressed to him was sent on the day I received your letter.

I regret that we will not be able to take advantage of your invitation this year, as the directors are just getting the threshing cleaned up, but you can count on us for the next Convention.

Again thanking you for the invitation, I am,

Yours very truly,
(Signed) C. C. Cook."

MR. JOHNSTONE: I would like to give official notice to this meeting that at the next Convention we will invite the Convention to be held in the city of Nelson and you are all welcome to our city of Nelson after the next Convention.

Moved by Mr. J. C. Dobson.

Seconded by J. L. Brown.

WHEREAS the Ninth Annual Convention of the Western Canada Irrigation Association is now nearing the close of a most successful meeting, and:

WHEREAS the co-operation and hospitality of the citizens of Bassano has been to a large extent responsible for this:

THEREFORE be it resolved: that this Convention pass a hearty vote of thanks to the Mayor, the Board of Trade and the Citizens of Bassano for their splendid reception, co-operation and entertainment to the delegates.

Carried Unanimously.

MR. LAWRENCE: Would it not be fitting at this stage of the proceedings to have a little discussion for the proper time for the Convention to be held next year? Would it not be of assistance to the Executive in fixing the date for the Convention?

MR. FAIRFIELD: In this connection it seems to me that when the Convention will be held in British Columbia, the great majority of delegates will be from British Columbia and the great majority of delegates at this Convention are from Saskatchewan and Alberta and I think it would be wise to leave it to the discretion of the Executive who are responsible for the getting up of the Convention for next year.

MR. SCOTT: What I think is we should get an expression from the Convention as to whether the end of June or the beginning of July would be a good time for the Prairie farmers. It would be all right for the people of British Columbia, but would it be so good for the people of the Prairie provinces.

CHAIRMAN: With reference to that matter, I have given some thought to it. My experience is that so far as the Prairie provinces are concerned, between the 20th of July and the time haying starts is good. I think the gentlemen from Kamloops in British Columbia who will have most to do with it, might have an expression as to when it would suit the Prairie farmers—if between the 1st and 20th of July would or would not suit them. The Executive last year went to a lot of correspondence in finding out a day to suit the people. Of course a date such as I mention, would not allow us to have the products to exhibit that we have at this Convention.

MR. LAWRENCE: Do you think the end of September would be a better time?

MR. PEARCE: No sir. That is the very height of working operations at that time.

MR. FAIRIELD: The farmers on irrigated land for instance in the Lethbridge district, are sometimes pretty busy up to the 10th or 12th of July with the first cutting of alfalfa, if they happen to be delayed, and it seems to me that the 20th of July would be somewhat early. I would think the end of July.

CHAIRMAN: Perhaps we can afford to forget the man who is not an irrigator but my experience is that the man cutting natural hay cuts after the 20th of July. In Saskatchewan they passed a law as some of the old timers here will remember, that no one could go out to the public domain and cut hay before the 25th of July and that is how that date came to be fixed so in the minds of farmers.

The election of officers took place with the following result:

Honorary President: The Honourable the Minister of the Interior.

Honorary President: J. S. Dennis.

President: The Hon. W. R. Ross.

Vice-President: Hon. Duncan Marshall.

Second Vice-President: Senator Bostock.

EXECUTIVES

J. L. Brown, Kamloops.

Jas. Johnson, Nelson.

F. Maurice Smith, Penticton.

W. E. Scott, Victoria.

F. H. Peters, Calgary.

G. R. Marnoch, Lethbridge.

R. A. Travis, Bassano.

Jos. Dickson, Maple Creek.

SEN. BOSTOCK: I wish to propose a most hearty vote of thanks to the most energetic Secretary I have ever had anything to do with and I have been connected with all sorts of Associations, but I have never run across a more energetic Secretary than Mr. Rankin and I wish to propose a hearty vote of thanks to Mr. Rankin and also to congratulate him.

CHAIRMAN: I have great pleasure in tendering to you, Mr. Rankin, the hearty vote of thanks which has been passed by this Convention. I do so because I think you are not only the most energetic Secretary I have had anything to do with, but you exercise a great deal of tact and cause less dissatisfaction than any other Secretary might do. (Vote of thanks given, all rising).

MR. RANKIN: I do not think there is very much that I can say except to thank you. I have of course had a great interest in this Association and it is part of my regular work and I think perhaps you are giving me a little more credit than is my due. There are others who have helped to make it a success and who are always behind me to back me up. At the same time, I am very proud to have your congratulations and good wishes and it is something I will always remember. I thank you very much for your expressions. (Applause).

CHAIRMAN: We will adjourn this session to meet again around the banquet table when the list of winners of the exhibition will be announced.

The meeting closed with the singing of

GOD SAVE THE KING.

Eng 104 A 0.42

DEPARTMENT OF THE INTERIOR OF CANADA

Hon. W. J. ROCHE, Minister; W. W. CORY, Deputy Minister

Irrigation Branch—E. F. DRAKE, Superintendent

REPORT OF THE PROCEEDINGS OF THE TENTH ANNUAL CONVENTION OF THE WESTERN CANADA IRRIGATION ASSOCIATION

HELD AT

KAMLOOPS, B.C.

July 25, 26 and 27, 1916

Published by the authority of the Hon. W. J. Roche,
Minister of the Interior

OTTAWA
GOVERNMENT PRINTING BUREAU
1917

Delegates to the Tenth Annual Convention of the Western Canada Irrigation Association
July 25 to 27, 1916, Kamloops, B.C.

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PREVIOUS CONVENTIONS

Calgary, Alberta, 1907

Vernon, British Columbia, 1908

Lethbridge, Alberta, 1909

Kamloops, British Columbia, 1910

Calgary, Alberta, 1911

Kelowna, British Columbia, 1912

Lethbridge, Alberta, 1913

Penticton, British Columbia, 1914

Bassano, Alberta, 1915

Officers of the Association

Officers of the Association now on Active Service

OFFICERS FOR THE YEAR 1915-1916

Honorary President—Hon. W. J. Roche, Minister of the Interior, Ottawa.

Honorary Vice-President—J. S. Dennis, Calgary.

President—Hon. W. R. Ross, Minister of Lands, Victoria, B.C.

First Vice-President—Hon. Duncan Marshall, Minister of Agriculture, Edmonton, Alberta.

Second Vice-President—Hon. Senator Bostock Ducks, B.C.

EXECUTIVE

Chairman—F. H. Peters.

F. Maurice Smith, Penticton, B.C.

J. L. Brown, Kamloops, B.C.

W. E. Scott, Victoria, B.C.

R. A. Travis, Bassano, Alta.

G. R. Marnoch, Lethbridge, Alta.

Joseph Dixon, Maple Creek, Sask.

James Johnstone, Nelson, B.C.

Permanent Secretary—Norman S. Rankin, Calgary, Alberta.

LOCAL BOARD OF CONTROL

Chairman—J. L. Brown.

Mayor Tyrrell.

Alderman Johnstone.

S. C. Burton.

J. F. Smith.

E. S. Wood.

Alderman Dobson.

H. S. Mytton.

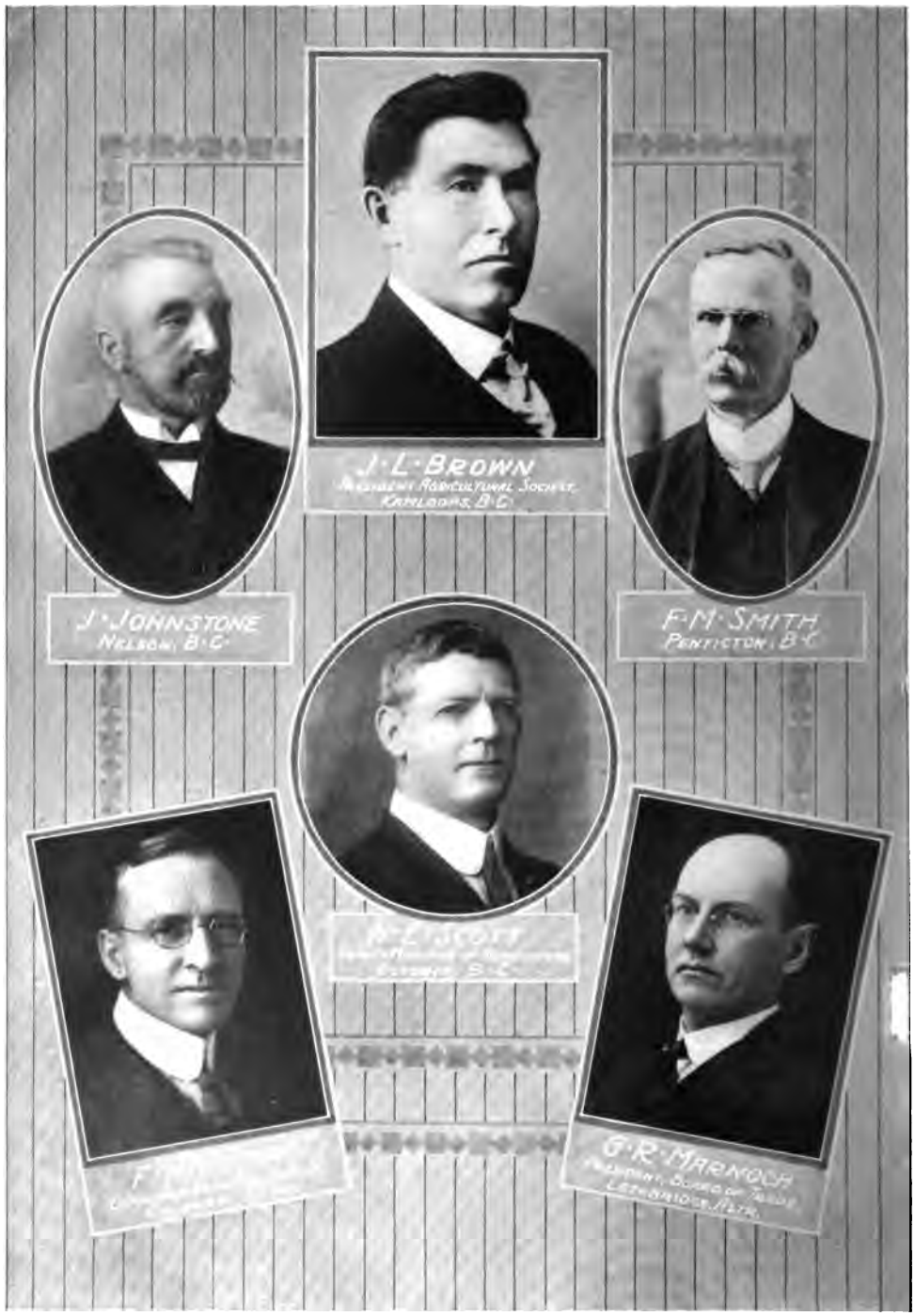
Capt. Worsnop.

Dr. George.

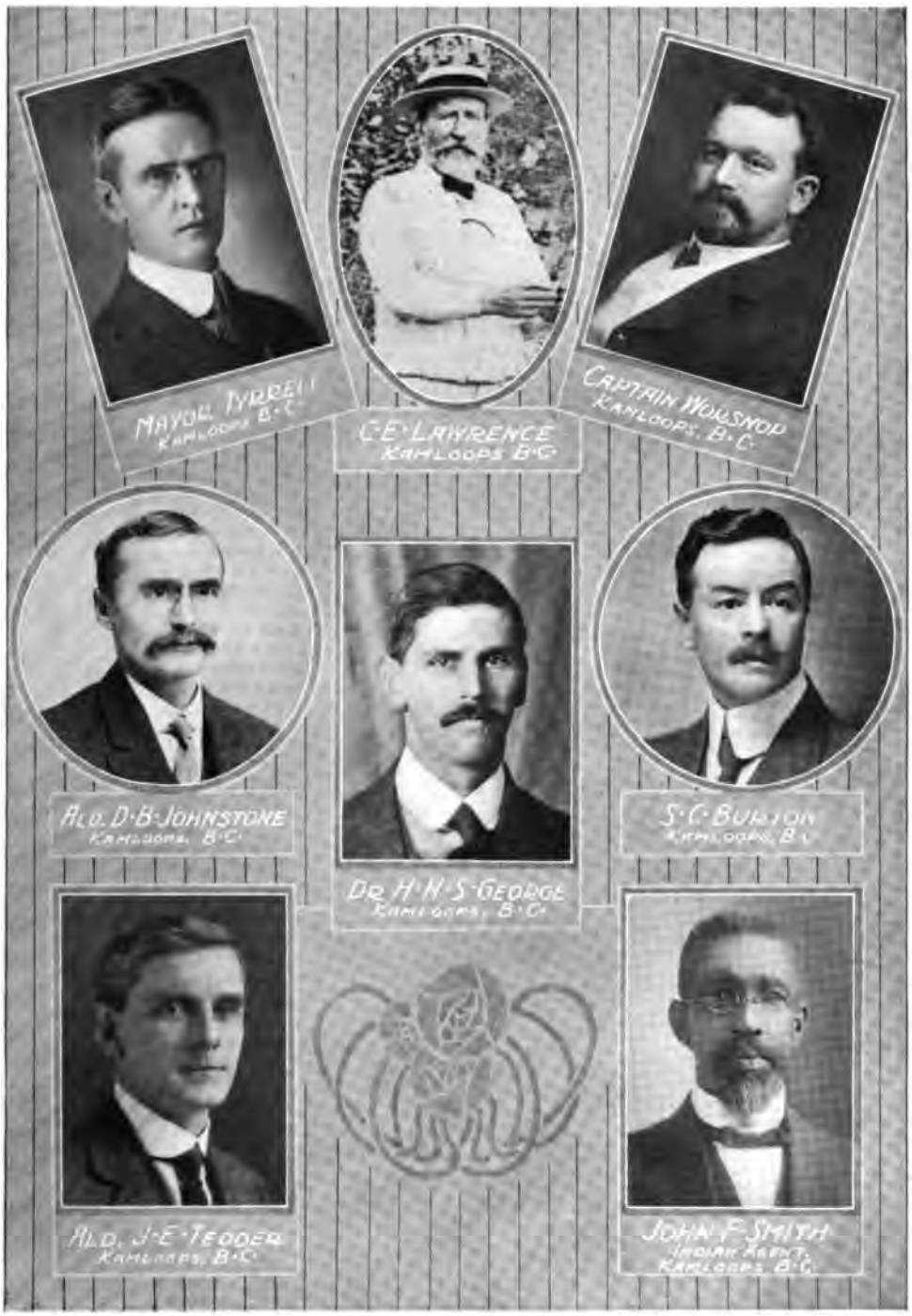
Secretary—C. E. Lawrence.

Treasurer—H. B. Adams, Manager, Bank of Hamilton.

Official Reporter—G. A. Morrison, Calgary.



Some Members of the Executive Committee



Some Members of the Local Board of Control

PROGRAMME

TUESDAY, JULY 25

9.30—Delegates and visitors will assemble in the Opera House and, led by the orchestra, will rise and sing "God Save the King."

Call to Order.—The Honourable W. R. Ross, President of the association, will call the meeting to order and declare the Tenth Annual Convention formally opened.

Invocation.

9.45—Welcome to the province, by the Honourable W. J. Bowser, Premier of British Columbia.

10.00—Welcome to the city, by His Worship, Mayor Tyrrell.

10.10—Introduction of Mr. J. L. Brown, Chairman, Local Board of Control.

10.20—President's address: Honourable W. R. Ross.

10.40—Secretary's report: Mr. Norman S. Rankin.

10.50—Address, by the Honourable D. Marshall.

11.15—Address, by Mr. J. S. Dennis, Assistant to the President, C.P.R.

11.30—Address, by Mr. E. F. Drake, Superintendent of Irrigation, Ottawa.

11.45—Address, by Mr. T. A. Hargrave, President, Cypress Hills Water Users' Association, Maple Creek.

12.00—Appointment of Committees on Credentials and Resolutions.
Adjourn for luncheon.

Show respect to the Chair by being punctual.

Afternoon Session

2.00—Address: The Honourable W. A. Motherwell, Minister of Agriculture, Saskatchewan, or representative.

2.15—Dr. Wesbrook, President University of British Columbia, "Agricultural Education in British Columbia."

2.50—Prof. E. A. Howes, Dean, Faculty of Agriculture, University of Alberta, "Agricultural Education in Alberta."

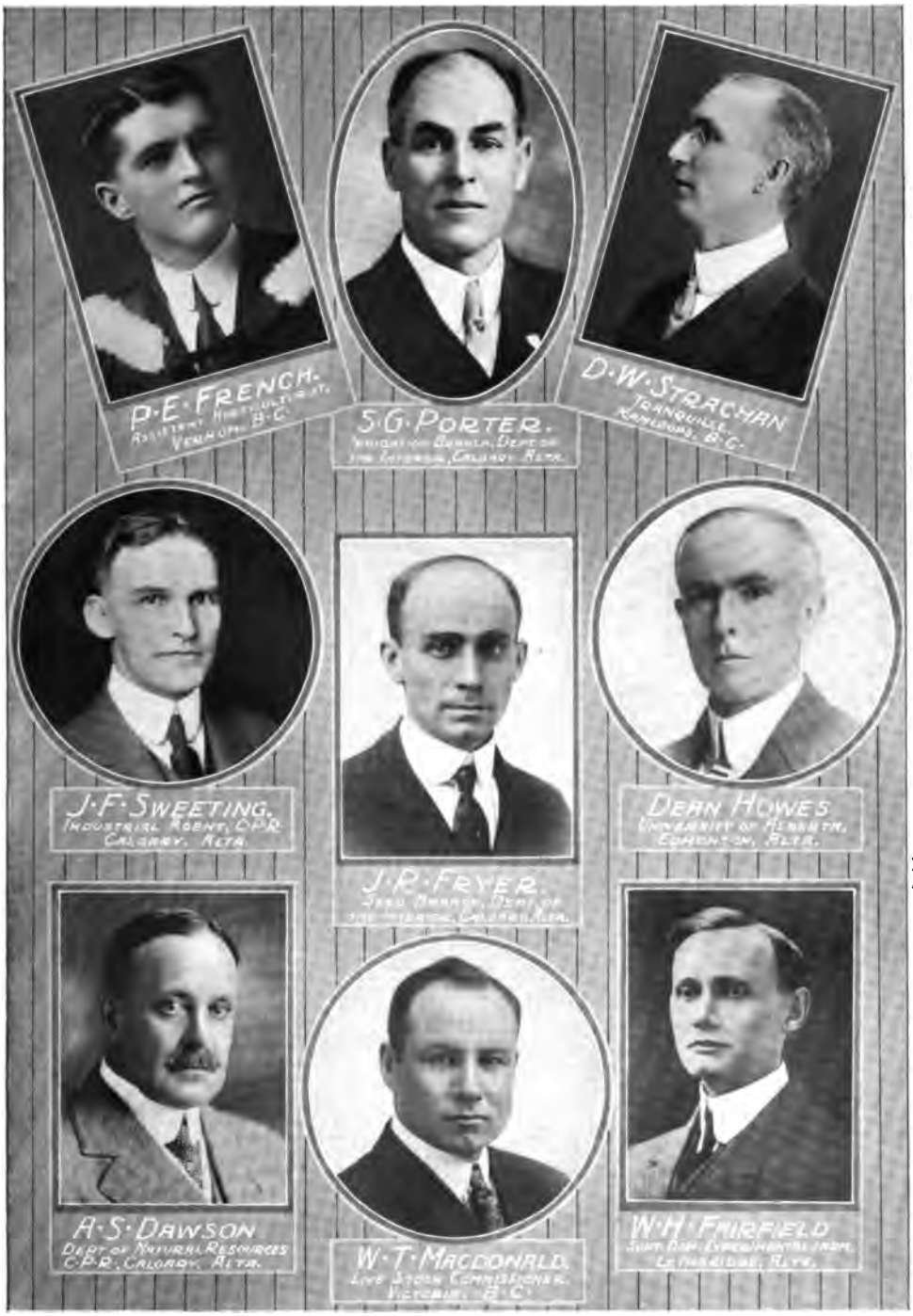
3.25—Fifteen minutes' discussion of previous addresses.

3.45—Dr. J. G. Rutherford, C.M.G., Superintendent of Agriculture and Animal Husbandry, Canadian Pacific Railway, Calgary.

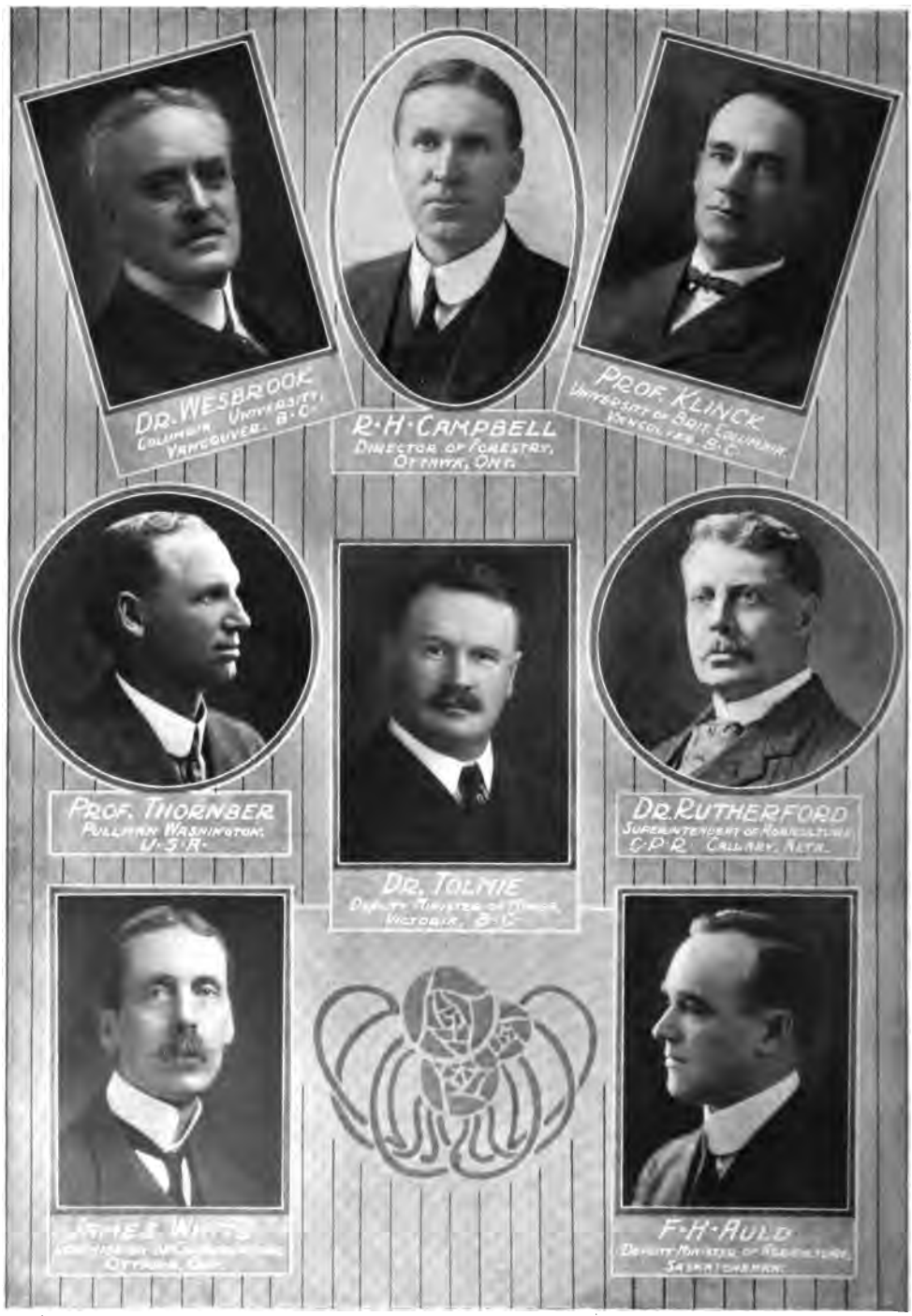
4.20—Prof. W. T. MacDonald, Live Stock Commissioner, British Columbia, "Live Stock and Irrigation."

4.45—Fifteen minutes' discussion of previous addresses.
Adjournment.

Punctuality is the first principle of order.



Some of the Speakers at the Convention



Some of the Speakers at the Convention

EVENING SESSION

8.00—Alderman J. E. Tedder, Chairman, Hydro-Electric Committee, Kamloops, British Columbia, "The Possibilities of Irrigation by a Hydro-Electric Power Plant in the Thompson Valley."

8.30—Discussion.

8.45—Prof. W. S. Thornber, State College of Agriculture, Pullman, Washington. Illustrated lecture—"Irrigation, a Factor in Community Development."

This session will conclude with an interesting function to be announced at the conclusion of Professor Thornber's lecture.

Don't YOU be absent when the Chairman takes his seat.

WEDNESDAY, JULY 26

MORNING SESSION

9.30—Mr. W. E. Scott, Deputy Minister of Agriculture, Victoria, British Columbia, "Patriotism, Production and Progress in Agriculture."

10.00—Mr. G. R. Marnoch, President of Board of Trade, Lethbridge, Alberta, "The Farmer and the City Man."

10.30—Fifteen minutes' discussion on previous addresses.

10.45—Mr. D. W. Strachan, Superintendent, Alexandra Ranch, Tranquille, "Mixed Farming."

11.15—Mr. F. H. Peters, Commissioner of Irrigation, Department of the Interior, Calgary, "Irrigation Districts Acts."

11.45—Preliminary Reports—Committee of Credentials—Committee of Resolutions.

Adjournment.

Time, Tide and the Automobile wait for no man.

AFTERNOON SESSION

Excursion to Tranquille. Owners of motor cars have kindly undertaken transportation of delegates and visitors to the far-famed Edward VII. Sanatorium and the Alexandra ranch. Those desirous of making this trip will please hand in their names in writing to the Secretary at the earliest moment.

Cars will leave the Opera House immediately after luncheon.

On the return journey a call will be made at the Home Farm, Fruitlands, by invitation of Mr. H. F. Mytton, where the transformation of desert land into lovely surroundings proclaims the home-making character of irrigation.

Time, Tide and the Chairman wait for no man.

EVENING SESSION

8.00—Professor L. S. Klinck, Dean of the Faculty of Agriculture, University of British Columbia—an illustrated lecture on "Improvements in Corn Varieties."

8.30—Mr. Don. H. Bark, Chief of Irrigation Investigations, C.P.R., Strathmore, Alberta—Illustrated lecture on "Practical Irrigation."
Discussion on previous addresses.

9.00—Mr. J. F. Sweeting, Industrial Agent, C.P.R., Calgary, "The Possibility of Sugar Beet Growing in Alberta."

Discussion led by Mr. P. H. Moore, Agassiz.

Adjournment.

Treat the Chairman with respect by being punctual.

THURSDAY, JULY 27

MORNING SESSION

9.30—Mr. Wm. Young, Provincial Comptroller of Water Rights, "Conservation and Distribution of Water."

10.00—Discussion.

10.30—Final Report of Committee on Credentials. Final Report of Committee on Resolutions.

11.30—Professor P. H. Moore, Superintendent, Dominion Experimental Farm, Agassiz, "Grading up a Dairy Herd."

12.00—Discussion.

Adjournment.

AFTERNOON SESSION

2.00—Mr. R. M. Winslow, Provincial Horticulturist and Inspector of Fruit Pests, "Apple Orcharding under Irrigation Conditions."

2.30—Mr. W. H. Fairfield, Superintendent Dominion Experimental Farm, Lethbridge, Alberta, "Growing Winter Feed Under Irrigation."

2.45—Mr. A. L. Fryberger, Bassano Colony, Alberta, "Varieties of Crops Successfully Produced in Bassano Colony."

3.15—Discussion.

3.30—Notices of Motion.

Next place of meeting.

Election of officers.

Evening Session

A trip to Mission (2½ miles) to see individual irrigation by water pumped from the Thompson river by the city of Kamloops hydro-electric plant at Barriere, forty miles distant, or

A personally conducted tour of the grounds of the hospital, provincial home and gaol, or

An evening visit to Fruitlands House and the Home Farm, by invitation of Mr. H. F. Mytton, or

Address by Mr. Fryer, Dominion Seed Department, "Production of Home-grown Field and Garden Seeds to Supersede Foreign Importations," or

Entertainment at the theatre.

Delegates and visitors staying after the convention should give early notice to the local Secretary in order that arrangements may be made to inspect irrigated lands or irrigation plants in the vicinity.

FRIDAY, JULY 28

The last session of the 1916 convention will be held in the Kamloops station of the Canadian Pacific Railway on Friday morning, the 28th inst.

8.00—The meeting will be called to order by the President, Honourable W. R. Ross, or, in his absence, by the Vice-President, Honourable Senator Bostock.

8.30—Arrival of H.R.H. The Duke of Connaught and Strathearn, K.G., etc., etc.

Introductory speech by the President, who will ask His Royal Highness to become patron of the association and accept the badge.

8.35—His Royal Highness will inspect the wounded soldiers returned from the front.

8.40—Convention will adjourn by singing the national anthem.

Departure of the vice-regal train.

CONVENTION RULES

Each morning session shall be called to order at 9.30, each afternoon at 2, and each evening session at 8. Morning session shall adjourn at 12.30 p.m., unless otherwise ordered by vote of the convention. All sessions shall open promptly.

Any delegate or other member desiring to speak shall address the Chair, and unless called on by name, shall begin by giving his name and place. Communications on subjects not entered in the programme will be limited to five minutes unless otherwise directed by vote of the convention.

General resolutions, after reading, shall be referred to the Committee on Resolutions without debate, and no general resolution shall be received after the opening of the convention without unanimous consent. Special resolutions relating to the conduct of the association may be read and considered at the discretion of the presiding officer after examination by him.

The time of speakers in general discussion shall be limited to ten minutes, and the time of speakers on questions or resolutions relating to the conduct of the convention shall be limited to five minutes unless otherwise directed by vote of the convention.

For the convenience of the convention and speakers, a bell will ring once three minutes before the close and twice at the close of the time allotted to each speaker on the programme. In the course of discussion and in addresses not entered on the programme, the bell will ring once one minute before the close and twice at the close of the time allotted to the speaker under these rules.

Any speaker rising to address the convention, who is in the employ, whether by retainer or otherwise, of any public service corporation which is interested in the action or subjects of deliberation of this convention, shall mention the fact and nature of such employment before proceeding to speak.

Report of the Proceedings

of the

Tenth Annual Convention

of the

Western Canada Irrigation Association

Held at Kamloops, B.C.

on

July 25, 26 and 27, 1916

OPENING SESSION—Tuesday, July 25—9.30 a.m.

The Tenth Annual Convention of the Western Canada Irrigation Association opened in Kamloops, B.C., on Tuesday, July 25th, at 9.30 a.m.

In the unavoidable absence of the President and Vice-President, the Chair was taken by the Honourable Senator Bostock, Second Vice-President.

In calling the convention to order, the Chairman said: "Ladies and Gentlemen, —In the absence of the Honourable Mr. Ross, the President of this association, it has devolved upon me to act as Chairman of this convention. It is my pleasant duty to declare this, the Tenth Annual Convention of the Western Canada Irrigation Association, formally open, and we will ask all to rise and join in singing 'God Save the King.' "

At the conclusion of the singing of the national anthem the Chairman said: "Our programme will be commenced by an invocation by the Rev. W. Littler of St. Paul's Church, Kamloops." The Rector then led the convention in prayer.

CHAIRMAN: The next item on our programme is an address of welcome which was to have been given by the Honourable the Premier of the province of British Columbia. In his absence I am going to call on Dr. Tolmie, who, as you know, is well acquainted with the resources of this province. (Applause.)

DR. TOLMIE: Mr. Chairman, Ladies and Gentlemen,—This request to give you an address of welcome only reached me a few moments ago, otherwise I would perhaps have been a little better prepared. We have a great deal of pleasure in extending to you all a welcome to this province of British Columbia. To those of you who have come some distance to attend at this convention and to our friends to the south of the line who have joined us on this occasion, we feel that this is perhaps one of the most important meetings with regard to agriculture that has been held in this province. We have in the dry belt of British Columbia an area very productive if handled under proper conditions and under proper irrigation methods. We feel that the possibilities here for agriculture are very great indeed. At the Coast we have already made a success of different lines of agriculture, and in regard to dairying, it has been proved there that given proper conditions and proper methods of feeding, we are able to compete with the best dairying sections of the world. The same applies to the irrigated portions of British Columbia and in the unirrigated portions where good dry land farming methods have been properly applied. We have produced mutton, but, unfortunately we have sold at the wrong time and we find that Alberta producers have got better prices by selling at the proper times of the year. I notice on one piece of literature supplied at this convention a picture of Glencarnock Victor, produced by Mr. J. A. McGregor, of Brandon. This great animal was taken by Mr. McGregor to Chicago, where he swept the board in competition with animals from the famous corn belt. The question of producing stock of this kind here in British Columbia is a matter that should be given some attention at the present time. While we have in this province large areas of uplands that will eventually be put under cultivation, we are importing four million dollars' worth of agricultural products from the Prairie provinces and from the South country. This should not be so. These products or the great majority of them should be grown at home and these large areas turned into grazing lands for stock and otherwise increase the production here as much as possible.

I do not mean to take up any more of your time. I notice the names of many good people on your programme who have good papers and many of them are noted speakers, some of whom are known throughout the world.

I wish to extend to you all a most hearty welcome to the province of British Columbia and hope that this convention will have very excellent results in furthering irrigation and agriculture here.

CHAIRMAN: The next item on the programme is an address of welcome from His Worship the Mayor of Kamloops. Those who live in Kamloops well know the Mayor, and I think it is rather unnecessary for me to say anything further in introducing Mr. Tyrrell to you. (Applause.)

MR. TYRRELL: Mr. Chairman, Ladies and Gentlemen,—It is a great privilege to be able to say something in a few words of welcome to the Western Canada Irrigation Association. I remember six years ago this convention meeting here, and it was a worthy incentive to the citizens and farmers of Kamloops and this district. The papers read at that convention were of great value and of much interest. I might say in this connection that the farmers and citizens of this city have taken advantage of the good seed sown in 1910 by your delegates. In 1910

Kamloops brought in about 90 to 95% of the grain that it used here. In 1915-1916 as well as supplying all the needs of Kamloops, the farming community have shipped out of Kamloops some 125 cars of grain. Where we used to bring in 90% of our needs we now have some to ship away. This, I think, shows that we are waking up to our possibilities here and have done something. This has been brought about by irrigation being more scientifically applied to the land; by intensive farming; by better methods of dry farming; and, I think, by better profits being made. Since the farmers commenced going out to the semi-arid hills that were only cattle ranges and there taking up lands, Providence seems to have blessed this land with more moisture each year. I am sure Dr. Tolmie will be interested to know that we have produced 40 to 45 bushels of wheat to the acre without irrigation in many sections adjacent to the city.

I am not a farmer or a speaker, but I certainly know that the farmers of this district appreciate having this convention here again, as do all the citizens of this city. The leaders in intensified farming are coming to this convention and I wish to assure you all that the entire freedom of the city is yours. The police force will disappear as far as a delegate or person with a badge is concerned. The town is yours for three days and we know you will do us good and in our humble way we appreciate it. Mr. Chairman, I thank you for allowing me to extend a welcome to the delegates. (Applause.)

CHAIRMAN: I will now call upon Mr. J. L. Brown, Chairman of the Local Board of Control, who has done such good work in getting the convention to meet in Kamloops.

MR. BROWN: Mr. Chairman, Ladies and Gentlemen,—I do not know why I should be down on this programme at all. I notice there is another speaker who will give an address somewhat like mine. However, although you have been welcomed to this city by an address from the representative of the Premier for the province, and also from the Mayor for the city, I as Chairman of the Local Board of Control, wish to extend a hearty welcome to all the delegates and their friends who have come here to this convention. I wish to pay a tribute to the Local Secretary here, because if a man ever worked to make a convention a success, Mr. Lawrence certainly did. One thing only was overlooked, I am afraid, and that is the citizens of Kamloops somehow seem to have thought they were not asked to come to this convention, but I think that will be remedied when the papers come out this afternoon. The Chamber of Commerce has taken active steps to have the national highway built from Princeton to the Coast. I have just been thinking that the Chamber of Commerce and the citizens might have been using their energies better in endeavouring to finish a road from the North Thompson to Edmonton, the inland capital of Alberta. There are lots of farmers in Alberta who have lots of money and who would like to live somewhere else besides on the prairie. The first thing they do is to head for Vancouver and they therefore do not know anything about this part of British Columbia. If they did I imagine they would settle down here. I had thought that some of the members of the Alberta Government and the British Columbia Government would be here and I would then bring it to their attention. I think it would be a great thing for the province

and would bring the people of the two provinces together, because in one of our long summer days you could make the trip in an automobile from Kamloops to Edmonton. (Applause.)

I would like to pay a tribute to our Permanent Secretary, as we have called him, but, I believe, we are now going to lose him. Any one who has been a delegate to these conventions will know that we will surely miss the services of Mr. Rankin and I think we should honour him all the more when we think of the position that Mr. Rankin is throwing up to fight for the Empire and Freedom. (Applause.) Lots of people think that the soldier's life is an easy life and one of lots of sunshine, but it is not. I would like to quote a story I read in a recent issue of the "Ranger," which may shed some light on the life of the soldier.

"He was a raw recruit. They took him to the barracks and changed his clothes. They took his name and then told him his number was 575. Then they marched him off to Church on Sunday—a place where he was quite a stranger. The minister got up to announce a hymn and said, 'We will now sing'—at this point the recruit awoke from his doze,—'No. 575, Art Thou Weary, Art Thou Languid.' In a clear voice the recruit said, 'Not a d—— bit.' He wondered afterwards why they gave him seven days C.B."

So the soldier's life is not so very easy outside of the trenches either.

I would like to say more than I dare, for after looking over the programme and knowing the speakers as well as I do, I know I will not get a chance to say any more at this convention.

There is another statement I was going to make in discussing irrigation and dry farming and comparing the methods. I am a dry farmer and have been for four years. I never hear the irrigators say anything about this. It pays better to dry farm in a wet year than it does to dry farm in a dry year (Laughter), and that is one point I have proven beyond a doubt. I meant to tell that at Bassano at the banquet, but I never got the chance. I know we have had dry years out here, but the wet years were very easy sailing and the dry years made pretty hard going.

I wish to extend a hearty welcome to all those attending the convention. If there is anything you want to know or anywhere you want to go, come to the Local Board of Control and we will do our best to inform you. (Applause.)

CHAIRMAN: The next item on the programme is an address by the President.

As I was only told that I had to occupy the Chair in the absence of the President a short hour ago, I do not think that I can fill that position and give you an address at the present time. I might make a few remarks on the questions that interest those in this part of the country particularly.

As you all know and as Mr. Brown has just stated that while very much interested in this question of water and this part of British Columbia, we have been struggling with it a great many years. Unfortunately this year we have had more water than usual and I was rather afraid before I arrived here this morning that we would not have a bright day, but instead have a day that has been so troublesome to the farmers putting up hay, because the rain has been interfering with their operations. However, I see we are going to have a bright day so that the visitors will see the usual weather of Kamloops. This year has not been, however, an ordinary year.

When I came here some twenty-four years ago, the question of irrigation was not so far developed as it is at the present time and we have in this particular dry belt of British Columbia, had to learn by "rule of thumb," and follow out the question of irrigation as best we could, rather than learn from properly designed plans laid down by irrigation engineers and others who have studied the question for years. What we have been trying to do is to see how much we could raise in the way of crops from the land and we did not altogether pay attention to the question of the amount of water we have used. Now that so many more people are coming into the country we are faced with this question of making the water go as far as we can and I think those who have been irrigating for a number of years realize that they raise their best crops by using as small an amount of water as is possible to cause the crops to grow. By so doing the quality of the crops is so much higher than when using a large quantity of water.

I am very sorry indeed that the Minister of Lands of this province is not here to-day, because I think the people of this district would have liked to have seen him to discuss the question of water with him on terms that we have not had an opportunity of doing for a long time. This question of water affects this portion of the country very materially and we have a great many problems ahead of us and I think a good many of the irrigators in this district feel a little apprehensive as to the proper method of working them out.

I hope that in the papers and discussions at this convention some attention will be given to this situation so that we can get some enlightenment on this question of water which, to this part of the country at least, is a very serious one.

I do not propose to take up your time any longer, ladies and gentlemen. I am glad to see so many visitors here from the States to the south of us and from the other provinces, and I hope that they will enjoy their visit to Kamloops and go away with a very good impression of Kamloops and the surrounding country. (Applause.)

CHAIRMAN: I will now call upon the Secretary to make his report.

MR. RANKIN: Mr. Chairman, Ladies and Gentlemen,—It is exceedingly gratifying to me as secretary of your association, to come before you here to-day and make report of our work since your last convention, and though the season has been the shortest in our history owing to the fact that our last meeting took place only in November, yet I hope you will feel that the work done during this brief period has been sufficient and worth while.

To sum it up briefly—the detail will duly appear in the annual report—it covers the following-up to conclusive action of our last meeting's resolutions; the financing of our affairs through grants from the Dominion and Provincial Governments of Alberta and British Columbia; a resultful campaign to induce settlers on the irrigated districts to beautify and improve their farms by the planting of windbreaks and shade-trees, which we secured for them free of cost; assistance rendered the Cypress Hills Water Users' Association with their annual meeting, and the usual issue of publicity through the press of the three western provinces. An executive meeting was held at Field during April, which reviewed the work accomplished to date, and outlined that to be done during the balance of the year. The

minutes of the meeting will be found set out in this report for the benefit of all concerned.

RESOLUTIONS

Regarding the resolutions passed at our last meeting, full details of all of which will be found on the files open for inspection by delegates on the table below, I will here touch on only one or two of the most important.

Mr. S. S. Dunham, Vice-President of the United Farmers of Alberta, seconded by President Marnoch of the Lethbridge Board of Trade, moved a resolution urging the Dominion Government to proceed with irrigation surveys in the southern country and in due course the matter was laid before the Right Honourable Sir R. L. Borden and the Honourable Minister of the Interior at Ottawa, both of whom replied that this work would be proceeded with without any halt. On April 29th, as will be noted from the minutes of the executive meeting held at Field, Commissioner F. H. Peters corroborated this statement with the statement that "the work of irrigation surveys in southern Alberta was being prosecuted as actively as possible."

Mr. C. W. Peterson, editor of the Farm and Ranch Review, moved a resolution urging the Dominion and Provincial Governments to institute enlarged educational propaganda through the alfalfa field and breeding of live stock. I will let the replies from Deputy Minister of Agriculture, W. E. Scott, of British Columbia, and Acting Deputy Minister of Agriculture, F. S. Auld, of Regina, speak for themselves as to what has been done in this respect, only adding that the reports are of progress all round, while Alberta is summed up very completely in a neat little 40-page folder issued by Mr. Don H. Bark, formerly Chief of Irrigation Investigations at Idaho, now occupying a similar position with the Canadian Pacific Railway at Strathmore. In mentioning this gentleman, I would like to point out that this association may take all the credit for the bringing of this valuable man from the United States to this country as it was through hearing Mr. Bark's address given at the Penticton convention that Dr. Rutherford decided to induce him to come over and help us. A copy of this pamphlet (Alfalfa and Mixed Pasture Grasses) can be secured upon application to Mr. Bark.

VICTORIA, May 16, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
P.O. Box 1317,
Calgary, Alberta.

DEAR MR. RANKIN,—I am in receipt of your letter of the 5th inst., enclosing copy of resolution passed at the Bassano convention last November, with reference to educational propaganda re alfalfa.

I enclose an article describing what this province has been doing in the last few years, and the policy of this department in encouraging alfalfa growing. You will notice that the acreage in alfalfa in the province was double in 1915 what it was in the year 1913. Our twelve demonstration plots in different parts of the province have undoubtedly been largely responsible for this satisfactory increase in this most lucrative crop.

Our distribution of alfalfa seed all over the province has also helped towards popularizing the growth of alfalfa amongst farmers. I look forward to seeing a larger proportionate increase in the near future. There are so many parts of the province that can grow alfalfa to the very best advantage.

In the Thompson valley, I saw last year a crop that was having its fourth cutting. The owner told me that his yield was over nine tons an acre. Of course, this is very exceptional, but I think in our irrigated districts that the average yield of alfalfa per acre would run about five tons.

Trusting that the article that I have submitted is suitable,

Yours very truly,

WM. E. SCOTT,
Deputy Minister.

ALFALFA IN BRITISH COLUMBIA

During the last four years the acreage seeded to alfalfa in British Columbia has more than doubled. This increase is largely due to the action taken by the British Columbia Department of Agriculture. (Note the increase as shown in the January edition of the Census and Statistics Monthly):

Acreage in alfalfa in B.C. in 1913 ..... 6,700 acres.
Acreage in alfalfa in B.C. in 1914 ..... 8,500 acres.
Acreage in alfalfa in B.C. in 1915 ..... 12,100 acres.

In 1913 the department selected 12 plots of one acre each scattered over the province, so that most conditions of soil and climate were represented. The department conducted on these acre plots careful investigational and demonstration work in the growing of alfalfa. In all cases the seed was supplied by the department. All expense in connection with the growing of the crop, and in many cases, a rental was paid by the department. The work on these plots was continued for two or three years under the supervision of experts from the department.

At the same time at several of our Investigation Stations experimental work was being carried on as to the best way to cultivate alfalfa, and to determine the possibilities for the local production of alfalfa seed.

In addition to this, for the past three years the department has distributed 5 samples of alfalfa seed, at greatly reduced prices, to members of Farmers' Institutes desiring to test the crop, while alfalfa seed for general seeding was distributed to the farmers at less than cost. The 5 samples were distributed with a view to carrying on co-operative tests and determining the suitability of the alfalfa crop to the various districts.

The immediate results of this policy, as indicated above, have been remarkable. It has been proven quite conclusively that alfalfa is the very best fodder crop for irrigated sections, and it is in these sections that the remarkable increase in the acreage seeded to alfalfa, indicated above, has taken place.

To supplement the investigational work with alfalfa and to demonstrate the value of this crop to the farmers of the irrigated sections, experts from the department have annually placed the results of the work of the Investigational Stations and of the co-operative tests before the farmers at the annual meetings of Farmers' Institutes, and at special lectures arranged for this purpose.

Owing to the size of the average farm of this province it would be hard to locate farmers in many localities who could afford to set aside five acres during any one year for experimental work in the growing of alfalfa.

This explains the action of the department in the selection of one-acre plots for this purpose.

REGINA, May 16, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary Western Canada Irrigation Association,
P.O. Box 1317, Calgary, Alberta.

DEAR SIR,—Your letter of the 5th inst. addressed to the Honourable Mr. Motherwell with copy of the resolution moved by Mr. C. W. Peterson and passed by the last annual convention of your association has been handed to me for attention in the absence of the Minister. The Government of Saskatchewan is keenly alive to the importance of extending the live stock industry in the province and in this connection realizes the importance of alfalfa among the forage crops. About five years ago the Government lent its support to a province-wide competition in the growing of alfalfa and contributed prizes in connection therewith to the extent of $6,500.00. During the currency of the competition ten-acre fields of alfalfa were planted by a large number of farmers and it is probably safe to assume that several times as many farmers tested smaller areas with this important leguminous crop. A demonstration given through competitions, of the successful culture of alfalfa, we think, proved satisfactorily to all concerned the place which alfalfa is likely to take in Saskatchewan agriculture. You are no doubt aware of the fact that irrigation projects in Saskatchewan are few and of minor importance as compared with similar undertakings in Alberta and for this reason a strict compliance with the terms of the resolution which you forwarded to the Minister would affect only a very small proportion of the farmers of this province. I wish therefore to point out that in what we have done and in what we are doing the Government of Saskatchewan and the College of Agriculture have anticipated the resolution and as a result of the action to which I have referred a great many farmers in this province are now growing alfalfa. Our policy in connection with the introduction of live stock is outlined in the enclosed circular. Fuller details are contained in the annual report of the department, copies of which I believe are in your possession.

Yours faithfully,
F. S. AULD,
Acting Deputy Minister.

EDMONTON, July 22, 1916.

N. S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Kamloops, B.C.

DEAR MR. RANKIN,—With respect to your alfalfa resolution passed last year, I am enclosing you an article which I wrote for the *Canadian Farm* that will give you the best explanation of what we are doing to encourage alfalfa in the province of Alberta.

I regret that I am unable to attend the convention as I had up until to-day expected to be able to go. However, I am sending Mr. James McCaig of my department and Mr. E. A. Howes, dean of the Faculty of Agriculture at the university is also going. Mr. McCaig, as you are aware, is the author of our *Elementary Agriculture* for public schools in Alberta and is very competent to represent the department. I am,

Yours very truly,
DUNCAN MARSHALL,
Minister of Agriculture.

"CANADIAN FARM," May 26, 1916.

PRODUCING ALFALFA SEED IN ALBERTA

HOW THE NEED FOR HOMEGROWN SEED HAS BEEN MET—A PRACTICAL SCHEME BEING WORKED OUT THROUGH THE SCHOOLS OF AGRICULTURE

By HON. DUNCAN MARSHALL, Minister of Agriculture

When reading the editorials in *Canadian Farm* of April 28, I noticed with interest your article on "Alfalfa," and particularly the opening sentence, which read: "Cannot something be done to encourage the production of more home-grown alfalfa seed?" I had very naturally given the same matter some thought and attention, and it occurred to me that you might be interested in what we did. I decided some time ago that the production of alfalfa in Alberta was largely a matter of educating the alfalfa grower, and this could best be done by making some effort to produce seed in different parts of the province. Wherever we have irrigation we have no difficulty whatever in growing splendid crops of alfalfa, and there are probably about twenty thousand acres under this crop in Alberta at the present time. However, we find more trouble with it as a dry land crop, and while we have grown it with more or less success on all our Demonstration farms, the difficulty in getting seed suited to all parts of our province was a very great one and I decided if we could get a number of the boys who were attending our three Schools of Agriculture to begin growing alfalfa for seed, that from these three centres we would soon have seed available for the whole province.

PLAN OUTLINED

In January of 1915 I decided to have some plan organized in these three schools for a competition in the production of the best bushel of alfalfa seed. One day in the following month of February, Mr. S. W. Hess, of Calgary, who is general manager of the Atlas Lumber Company, a company that has lumber yards in a good many Alberta towns, called at my office and said he had just dropped in to say that he was interested in what our Department of Agriculture was doing throughout the province, and that his company was naturally interested in the improvement and progress of agriculture, and he had called to say that he would be glad of any suggestion from me as to how the company could be of any assistance to the department. I do not think I hesitated a minute, but replied: "Give me a cheque for $50 and induce two other lumber companies to do the same, and we will offer prizes of $25, $15 and $10 for the production of the best bushel of alfalfa seed by the boys at each of our three Schools of Agriculture." I briefly outlined to him my plan and the value of having the boys produce the seed, and what it would mean in the spread of this great fodder crop over the province. Mr. Hess did not hesitate either, but replied that this was just what he came to find out. He said I should have the cheque from the Atlas Lumber Company and he was quite confident he could also secure the other two.

On February 27th I received a letter from Mr. Hess, enclosing a cheque from the Atlas Lumber Company for $50 and the same mail brought a letter from Mr. E. T. Critchley, general manager of the Crown Lumber Company, also enclosing a cheque for $50. Mr. Hess specified that the Atlas cheque should go to the Olds School, and Mr. Critchley sent his for the Claresholm School. Six days later, on March 5th, I received a letter from Mr. G. E. Hayward, manager of the Hayward Lumber Company, enclosing a cheque for $50 for the Vermilion School.

DONATES THE SEED

Instructions were immediately sent to the Principals of the three schools to arrange for the competition among the students, the alfalfa to be sown in the spring of 1915, and the seed to be harvested this year, 1916. We also decided to furnish the boys with Alberta grown seed to begin with, as a good deal of seed has been grown on the irrigation lands at Lethbridge and near Medicine Hat. We communicated with Mr. W. A. McGregor, of Medicine Hat, who has been the most extensive grower of alfalfa seed in the province. Now Mr. McGregor, who, by the way, is a son of J. D. McGregor, the noted Angus breeder, of Brandon, Man., seems inclined to reverse the motto of his famous forbear, Rob Roy MacGregor, whose motto was: "For they shall take who have the power and they may keep who can," and he very generously came back with an offer, to help along the good work of spreading alfalfa over the province, by giving all the boys who entered the competition, at all three schools, a supply of Alberta grown seed free of charge. You can easily see what an added stimulus this was to the plan. Some fifty boys from the three schools entered the competition and this year will harvest their seed. The Instructor in Field Husbandry from each of the schools visited these boys last year to give them help and instruction regarding the seeding of their crop and will visit them again this year with regard to the harvesting of it.

The result of this competition has been to arouse an added interest in the growing of alfalfa in 50 neighbourhoods covering a great part of the province. The companies who gave the prizes have also taken quite an interest in the competition, and Mr. Hess informed me recently that he hoped to visit some of the boys alone without Field Husbandry Instructor this year, and so well are they convinced of the value of the competition that they have repeated the prize money for another competition, beginning this year and concluding in 1917, which gives our freshman class a chance to get into the alfalfa game this spring. This means another group, or rather three groups, more of alfalfa growers beginning next month. This not only means the growing of alfalfa, but it means a great deal to the boy who is in this way putting into practice on his father's farm some of the things he has learned at the School of Agriculture. The working out of schemes such as this is the foundation of a useful system of training boys to farm.

What we are doing in alfalfa we are doing in many other lines, but because our scheme was so much in line with your editorial I felt constrained to pass these few remarks on to you. I frequently wish I had the time to make comments, largely for my own benefit and information, upon many of the articles I see in the eight or ten agricultural papers I read religiously, as often as they are published, but one thing seems to crowd upon another so rapidly these days and each month seems so much shorter than its predecessor that I rarely have time to indulge myself in anything so akin to pleasure or recreation, that is, if writing be as real a pleasure as I find in reading agricultural journals.

William Pearce, in a resolution, urged the Dominion Government and the province of British Columbia to continue without interruption the work of gauging streams, and the following letters from F. H. Peters, Commissioner of Irrigation, Dominion Government, and William R. Ross, Minister of Lands for British Columbia, assure us that sufficient appropriations have been made to continue this very important work.

CALGARY, Alberta, May 10, 1916.

DEAR MR. RANKIN,—I have your letter of May 5th, in connection with the carrying on the work of stream measurement by the Irrigation Branch of the Department of the Interior.

I am very pleased to be able to state that a sufficient appropriation has been made to the branch, and that the stream measurements will be continued without interruption during the year 1916.

Yours very truly,
F. H. PETERS,
Commissioner of Irrigation.

N. S. RANKIN, ESQ.,
Western Canada Irrigation Association,
P.O. Box 1317,
Calgary, Alberta.

VICTORIA, May 22, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
P.O. Box 1317,
Calgary, Alberta.

DEAR MR. RANKIN,—I beg to acknowledge the receipt of your letter of the 5th May, file 57, in which you refer to a copy of a resolution passed at the Bassano convention on November 23rd last, regarding the continuance of gauging streams.

In this connection I might state that the B.C. Hydrographic Survey has charge of a greater part of the stream gauging, but so far as I am aware all our stations will be continued, with a few exceptions, where, on account of local conditions it has been found impracticable to continue them.

Yours very truly,
WM. R. ROSS,
Minister of Lands.

EXHIBITION OF SOIL PRODUCTS

For the first time in the history of the association, an Exhibition of Soil Products (both irrigated and non-irrigated) was held simultaneously with the convention at Bassano, bringing entries from as far east as Rosthern, Saskatchewan, and as far west as Notch Hill, British Columbia. Some twenty-nine classes produced keen competition on the part of the farmers, and as will be seen from the prize list below, the honours were pretty fairly divided between the three provinces.

The association is indebted to the Agricultural Branch of the Department of Natural Resources, Canadian Pacific Railway, to Mr. George Lane, The Crowfoot Farming Company (C. W. Peterson) and Dominion Farming Company (F. W. Crandall) for donations in cash towards the prize list and expenses of this exhibition, and to the town of Bassano for the free use of the exhibition hall.

LIST OF PRIZES

All exhibits must have been grown or produced in Western Canada by the exhibitor himself during the season of 1915. Entries must be made with R. A. Travis, Secretary, or B. T. Gray, Chairman, Exhibits Committee, Local Board of Control, Bassano, not later than November 22nd. No entry fee required.

NOTE: All bunches or sheaves of hay and grain must be full six inches in diameter at smallest point.

Prize List

FOR

EXHIBITION OF SOIL PRODUCTS

(Irrigated and Non-Irrigated)

To Be Held In Connection With

WESTERN CANADA IRRIGATION CONVENTION

BASSANO

NOVEMBER 23-24-25, 1915

Class

1. Honour display by a Government, Corporation or District. Exhibits may also include articles produced or manufactured in the district represented.

Prize Winners

ALFALFA

2. Best sheaf. To be judged for hay. Quality of stalks, leafiness and colour to be considered—as well as size of plant, the latter being an indication of probable yield.
   1st—J. E. Robinson, Bassano Colony, Alta. $15.00
   2nd—W. R. Abbott, Maple Creek, Sask.. ..... 10.00
   3rd—Seager Wheeler, Rosthern, Sask. 5.00

3. Best six-inch bundle of alfalfa (tallest).
   1st—W. R. Abbott, Maple Creek, Sask. 5.00
   2nd— 2.50

24. Best peck of alfalfa seed.
   1st—W. J. Phillips, Brooks, Alta. 10.00
   2nd— 5.00

TIMOTHY

5. Best six-inch bundle—quality and value for hay being the chief consideration.
   1st—W. R. Abbott, Maple Creek, Sask. ..... $ 5.00
   2nd— 2.50

WESTERN RYE GRASS

6. Best six-inch bundle.
   1st—W. R. Abbott, Maple Creek, Sask. ..... $ 5.00
   2nd—W. E. Smith, Revelstoke, B.C. 2.00

PEAS

15. Best six-inch bundle (value for forage).
   1st—Seager Wheeler, Rosthern, Sask. ..... $ 5.00
   2nd— 2.50

BROME GRASS

8. Best six-inch bundle (value for forage).
   1st—W. R. Abbott, Maple Creek, Sask. ..... $ 5.00
   2nd—W. E. Smith, Revelstoke, B.C. 2.50

RED CLOVER

7. Best six-inch bundle.
   1st—W. E. Smith, Revelstoke, B.C. ..... $ 5.00
   2nd—Seager Wheeler, Rosthern, Sask. 2.50

WINTER RYE

9. Best six-inch bundle.
   1st—W. E. Smith, Revelstoke, B.C. ..... $ 5.00
   2nd— 2.50

HARD WINTER WHEAT

Class

10. Best six-inch sheaf.
    1st—Seager Wheeler, Rosthern, Sask. $5.00
    2nd— 2.50

25. Best bushel threshed grain.
    1st— 7.50
    2nd— 5.00

HARD SPRING WHEAT

11. Best six-inch sheaf.
    1st—Seager Wheeler, Rosthern, Sask. ..... $ 5.00
    2nd—A. S. Culbertson, Bassano, Alta. 2.50

26. Best bushel threshed grain.
    1st—Seager Wheeler, Rosthern, Sask. 7.50
    2nd—J. S. Fields, Regina, Sask. 5.00

OATS

12. Best six-inch sheaf.
    1st—R. B. Robson, Crowfoot, Alta. ..... $ 5.00
    2nd—Seager Wheeler, Rosthern, Sask. 2.50

27. Best bushel threshed grain.
    1st—S. W. Forster & Sons, Nateby, Alta. 7.50
    2nd—R. H. Carter, Fort Qu'Appelle, Sask. 5.00

BARLEY

13. Best six-inch sheaf.
    1st—W. R. Abbott, Maple Creek, Sask. ..... $ 5.00
    2nd— 2.50

28. Best bushel threshed grain.
    1st—John Clark, Crowfoot, Alta. 7.50
    2nd— 5.00

CORN

14. (a) Best six ears Field Corn.
    1st—F. A. Taylor, Kelowna, B.C. ..... $ 2.50
    2nd—S. Unsworth, Maple Creek, Sask. 1.00

    (b) Best six ears Sweet Corn.
    1st— 2.50
    2nd— 1.00

    (c) Best twelve stalks Fodder Corn.
    1st—W. R. Abbott, Maple Creek, Sask. 5.00
    2nd— 2.50

FLAX

29. Best peck of Flax Seed.
    1st—R. B. Robson, Crowfoot, Alta. ..... $ 7.50
    2nd—Giffin Bros., Thompson, Alta. 5.00

POTATOES

Class

20. Best peck of Potatoes.
    1st—Cluny Nurseries, Cluny, Alta. ..... $ 5.00
    2nd—W. E. Smith, Revelstoke, B.C. 2.50

SUGAR BEETS

16. Best six specimens.
    1st—A. L. Fryberger, Gem P.O., Bassano Colony, Alta. ..... $ 5.00
    2nd—F. Barnard, Notch Hill, B.C. 2.50

TURNIPS (field roots)

17. Best six specimens.
    1st—C. Rodbourne, Crowfoot, Alta.. ..... $ 2.50
    2nd— 1.00

ONIONS

18. Best peck of Onions.
    1st— ..... $ 5.00
    2nd— 2.50

CABBAGE

19. Best three heads.
    1st—C. Rodbourne, Crowfoot, Alta. ..... $ 2.50
    2nd— 1.00

GARDEN COLLECTION

4. From farmer's own garden. To consist of not less than six different sorts of vegetables. A reasonable quantity of each required.
    1st—John Hamilton, Coaldale, Alta. ..... $ 7.50
    2nd—Chas. Rodbourne, Crowfoot, Alta. 5.00

PRESERVED FRUITS

21. Best glass jar of preserved or canned homegrown fruit, either cultivated or wild.
    1st—Mrs. H. Pattin, Bassano, Alta. ..... $ 3.00
    2nd—R. J. Kemp, Hutton, Alta. 2.00

BREAD

22. Best two loaves home-made bread, baked by farmer's wife, sister or daughter.
    1st—No name on entry—U.F.A. Box 247, Strathmore ..... $ 3.00
    2nd—Mrs. W. S. Pollock, Gem P.O., Alta. 2.00

BUTTER

23. Best home-manufacture by farmer's wife, sister or daughter—2 prints of one pound each.
    1st—Giffin Bros., Thompson, Alta. ..... $ 3.00
    2nd—A. P. Miller, Gem P.O., Alta. 2.00

ENTRY FORM

Exhibition held in conjunction with the

9th ANNUAL CONVENTION WESTERN CANADA IRRIGATION ASSOCIATION

Bassano, Alberta

NOVEMBER, 23, 24 and 25, 1915

ENTRY FREE---All to have equal display space. No points for display---for quality of exhibits only.

I hereby make the following entries subject to conditions as published :

Class No. .....

.....

.....

.....

.....

.....

.....

NAME .....

ADDRESS.....

To be mailed to

Board of Control, Bassano, Alberta:

R. A. TRAVIS, Local Secretary

TREE PLANTING ON THE PRAIRIES

The attached correspondence regarding the association's campaign to induce settlers on the prairie to plant wind-breaks and shade-trees is self explanatory. I only wish to add the information that through the courtesy of the Dominion Director of Forestry, R. H. Campbell, Ottawa, the Government Chief of Tree Planting Division at Indian Head forwarded me the required number of bulletins which were duly sent out to our prairie mailing list. I am informed by Mr. Don H. Bark, in charge of Irrigation Investigations for the Canadian Pacific Railway, that approximately 100,000 trees were distributed to the settlers.

DEPARTMENT OF THE INTERIOR,
IRRIGATION OFFICE,
CALGARY, Alta., January 11, 1916.

N. S. RANKIN, ESQ.,
Western Canada Irrigation Association,
c.-o. J. S. Dennis, Assistant to the President,
C.P.R. Company, Montreal, Que.

SIR,—I am writing you this letter on the question of tree plantation as one of the first essentials in the establishment of farm homes on the western prairies, having the understanding from other officials of the association that the present is a particularly opportune time for our association to take some active steps in this connection.

I feel satisfied that I am safe in assuming that perhaps the greatest fault in the colonization of our western prairies has been the lack of the establishment of pleasant homes by the farmers, such homes as by their pleasant aspect and surroundings will constitute in the parents a pleasurable pride, and such as will constitute in the children a feeling that the old home is the nicest place they have ever known —and I further feel safe in stating that any person having a full knowledge of our prairie conditions will not contradict the statement that perhaps foremost amongst the requirements for the making of a pleasant and lovable home is the establishment of tree plantations that will give shelter from the ever present prairie winds, break the endless dull monotony of the landscape on the prairie and provide for the parents and children and the live stock on the farm a patch of shade trees where, during the great heat of our sunny summers, they can have some little rest under the shade and protection of the trees.

Accepting the statements made above I feel that every man interested in the development of our prairies is negligent in an absolutely inexcusable way, who does not realize that the irrigated districts are pre-eminently the places where trees should be grown about the homes because it is a well understood fact that while the growing of a tree plantation is a matter of considerable difficulty and expense on dry farms, that many of our native or imported trees will flourish and grow luxuriously without any question of a failure where irrigation water is available.

Looking for precedent in this matter I would quote that the Mormons of the United States, who are the oldest irrigators in America have followed the practice from the very commencement of their organization and almost as a matter of religion have always from the very outset of all their colonization carried on a very liberal plantation of trees.

The thought occurs to me that this association might properly point out to the officials of the Canadian Pacific Railway Company, who are the greatest colonizers in the Canadian West, of the great, and to my mind inexcusable, lack of tree plantation in their large irrigation block lying to the east of the city of Calgary, and if it be not improper on our part to do so, we might suggest to them as a matter

of self interest the almost immeasurable advertizing value that the tree plantation would have for the promotion of their irrigation colonization schemes and the creation of real homes therein.

I was immensely struck on a trip which I took a year or two ago through the irrigated portions of the state of Utah, by the fact that in travelling on the train through this hot and dusty desert one could always look out of the train window from time to time and the first view and only view that could be had at a distance of the irrigation towns was an immense grove of so-called Mormon poplars, and the impression that these tree plantations made upon the mind of the traveller was very great and lasting. On the contrary while travelling on the Canadian Pacific Railway line through the Western Section I have time and again been questioned by interested travellers to know when we were coming to this much advertized irrigation block, and it is always the case that unless this traveller is quick enough to catch sight of the irrigation ditch or the large sign board that is erected just east of Calgary, there is absolutely nothing to indicate that he is travelling through an irrigated block, and think what an impression would be made upon the traveller's mind if the fact that he was in the irrigation block could be brought home to him in the most striking manner possible by the view of some tree plantations which would immediately catch the eye. I am satisfied that this idea is correct because since the policy has been adopted of replacing the old fence snow guard with the little tree plantations I have always noted that these little plantations have attracted more attention from the travellers than even the great grain fields seen at their best, because after a time the sight of the grain fields begin to pall and the sight of the green trees never does on the prairie.

This question is, I am fully satisfied, one of the big questions that have to be faced in our colonization, and I feel that it is worthy of most full consideration. The question is too big a one to endeavour to deal with in any detail in a communication of this kind, but I trust that in a broad way I have placed the facts before you and I believe the matter is worthy of your fullest efforts along such lines as you may think are the most desirable.

Your obedient servant,

F. H. PETERS,
Chairman, Executive Committee.

CANADIAN PACIFIC RAILWAY COMPANY,
DEPARTMENT OF NATURAL RESOURCES,
CALGARY, Alta., February 8, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Calgary, Alberta.

DEAR SIR,—I have noted Mr. Peter's letter of the 11th ultimo.

I am heartily in sympathy with the tree-planting programme advocated by Mr. Peters, and you might advise him that this year we have secured an appropriation of $4,000.00 to be expended in encouraging the growth of trees by the settlers in our irrigation block, and we also intend to do considerable tree planting along our ditches and at our Operating Headquarters.

Yours very truly,

J. S. DENNIS,
Assistant to the President, C.P.R.

February 11, 1916.

File No. 61—NSR-A.

To the Executive,
Western Canada Irrigation Association,

Dear Sir,—Early in January Mr. Peters, in a letter, pointed out that one of the first essentials in the establishment of farm homes on the Western prairies in the irrigated districts was tree plantations and that this association might very properly point out to the officials of the Canadian Pacific Railway, who are the greatest colonizers in the Canadian West, the great and inexcusable lack of tree plantations in their irrigation block east of Calgary. Accordingly I took the matter up with our Honorary Vice-President, Mr. J. S. Dennis, who is in charge of the Company's irrigation interests. I am to-day in receipt of a letter from him expressing his hearty sympathy with the tree planting programme advocated and stating that he has set aside an appropriation of $4,000.00 to be expended for this purpose. After discussing the matter with Mr. Peters we thought it would be an opportune time for this association to issue a memorandum to settlers on irrigable farms pointing out to them the benefits which would accrue from planting trees on their holdings and that the trees would now be available to them through the Canadian Pacific Railway Department of Natural Resources. Will you please let me have your views upon this matter as in the event that the Executive approve we would like to get out a circular and proceed actively with a campaign to induce the settlers to plant trees.

Yours very truly,

Norman S. Rankin,
Secretary.

April 6, 1916.

File No. 61—NSR-A.

Norman Ross, Esq.,
Chief of Tree Planting Division,
Government Farm,
Indian Head, Sask.

Dear Sir,—In a letter received this morning from Mr. Campbell, Director of Forestry, to whom I wrote for a supply of tree planting bulletins for distribution to the irrigation farmers in this province and Saskatchewan, he suggests that I furnish you with a list of names and addresses to whom I propose sending these bulletins so that you may check them over and return it to me, striking off the list those to whom your records show these bulletins have already been sent. I will appreciate you doing this at your earliest convenience.

Yours very truly,

Norman S. Rankin,
Secretary.

DEPARTMENT OF THE INTERIOR
CANADA

R. H. CAMPBELL, Director of Forestry, Ottawa, Ont.
NORMAN M. ROSS, Chief of Tree Planting Division,
Indian Head, Sask.

FORESTRY BRANCH, Nursery Station,
INDIAN HEAD, Sask., April 8, 1916.

N. S. RANKIN, ESQ.,
Western Canada Irrigation Association,
Box 1317, Calgary, Alta.

DEAR SIR,—I am in receipt of yours of the 6th inst., File No. 61, enclosing the list of farmers to whom you wish to have tree bulletins sent. We will check over the list with our files and will mark those who have already received our bulletins. A list of those who have not yet received our bulletins will then be sent to our office at Ottawa and bulletins will be forwarded directly to them from there.

Your obedient servant,

NORMAN M. ROSS,
Chief of Tree Planting Division.

April 12, 1916.
File No. 61—NSR-A.

TO THE EXECUTIVE,
WESTERN CANADA IRRIGATION ASSOCIATION.

DEAR Sir,—In furtherance of my letter to you of February last, in which Mr. Peters pointed out the regrettable lack of tree plantations in the irrigated districts, I have to advise that the Canadian Pacific Railway, through its Forestry and Irrigation Departments, are already in touch with the settlers in these districts and are making delivery of trees, as you will note from the attached newspaper clipping.

In reply to my letter, the Honourable W. J. Roche, Minister of the Interior, advised that the Forestry Branch had for years been urging upon the settlers in the prairie provinces the desirability of planting shelter belts and tree plantations, and had supplied millions of trees free of cost, and went on to say that if we would encourage the growth of these plantations, it would bring about as nothing else would, a distinction between irrigated and non-irrigated lands and in the end be a most profitable undertaking.

I found that the Forestry Branch of the Dominion Government had issued a bulletin (No. 1) on "Tree Planting on the Prairies" and a circular (No. 5) on "Planting a Tree Plantation for a Prairie Homestead," and on writing to Mr. Campbell was offered a supply for free distribution.

With Mr. Peters' help, I have compiled a list of all settlers in the irrigated districts of Alberta and Saskatchewan, which I have forwarded to Mr. Norman Ross, Chief of the Tree Planting Division of the Government at Indian Head, Saskatchewan, who offers to send these bulletins and circulars direct to each name on our list.

I have the honour to be, sir,
Yours very truly,

NORMAN S. RANKIN,
Secretary.

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS
EXPERIMENTAL STATION FOR SOUTHERN ALBERTA.

LETHBRIDGE, Alberta, May 27, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Calgary, Alberta.

DEAR MR. RANKIN,—In reply to your letter of the 9th inst., File No. 61, in which you were good enough to enclose a copy of the minutes of the Executive meeting held recently at Field, I may say that I have given the matter referred to regarding the most satisfactory tree for general use in the irrigated areas on our prairies, a good deal of consideration.

For shelter belts mixed planting should always be practised where possible. Among the trees suitable for this purpose would be included the native cottonwood, elm, ash (providing the last two are propagated from seeds collected in the Canadian North-West, for seeds collected in the northern states of the same varieties are not always satisfactory), willows and Manitoba maples. The last kind is used more particularly for a cover crop. Our experience has been that Manitoba maples are not very satisfactory to plant by themselves in irrigated districts in southern Alberta because the irrigation is apt to cause too much late growth, making the wood so sappy when it goes into the winter that it will not stand the heavy drying warm winds the latter part of the winter and in the early spring.

The best kind of tree to plant where but one sort is used in the irrigated districts along the banks of small ditches in southern Alberta, is undoubtedly the native cottonwood. This tree is found in the irrigated districts in the Rocky Mountain region from the Canadian border right down into Mexico. The peculiar adaptability of this tree for such a purpose is that it thrives in wet places but still will stand long periods of drought without serious setback. It grows rapidly, which is a characteristic that all kinds of trees planted in new districts on the prairies should have, it has a fairly good length of life and is reasonably free from insect pests and fungus diseases.

The native cottonwood is not found on the Belly river much above the city of Lethbridge and on the Bow river it pinches off somewhere between the junction of that river with the Belly and the city of Calgary as it is not found in the natural state in the vicinity of Calgary. In my judgment commercial nurseries in the province should make a point of propagating from this native tree, for on the Experimental station we have found that trees of this same variety when brought in from Dakota are not perfectly hardy. In fact this past winter we have had some large Dakota cottonwoods killed back while the native ones are alive and vigorous to their tips.

It seems to me that the Western Canada Irrigation Association could accomplish much good by encouraging the general planting of the native cottonwood around buildings, along the edges of fields, and on the banks of smaller ditches where they will not be an inconvenience to field operations, for they will grow rapidly and will soon change the general aspect of the landscape in the irrigated localities. In the shelter afforded by these trees it will be possible to raise fruit trees, etc.

At the same time that the cottonwoods are being planted a good utility tree such as the ash could be planted. The ash grows very much slower and although it lacks many of the advantages that the cottonwood possesses, still it is a tree that produces wood of much more value which eventually will be a point to be considered.

Very sincerely,

W. H. FAIRFIELD,
Superintendent.

FOURTH ANNUAL CONVENTION, CYPRESS HILLS WATER USERS' ASSOCIATION

The Fourth Annual Convention of the Cypress Hills Water Users' Association was held at Maple Creek on June 5th, there being a fair attendance, the delegates being called to the meeting by post card. The convention consisted of two sessions, morning and afternoon, the evening meeting being merged with that of the Live Stock Association.

The weather was bad and roads almost impassable.

Deputy Minister Craig of the Department of Agriculture; A. S. Dawson, Chief Engineer, Department of Natural Resources, Canadian Pacific Railway; F. H. Peters, Commissioner of Irrigation and R. S. Stockton, Superintendent of Operation and Maintenance, Western Section, Canadian Pacific Railway Irrigation Block, represented this association. All addressed the meeting. Acting Deputy Minister Auld of Saskatchewan attended and made a brief address in the evening. T. A. Hargrave, President, occupied the Chair.

F. H. Peters spoke on the necessity of reservoir construction; A. S. Dawson, "The Basis of successful irrigation enterprise is the small project"; R. S. Stockton, "Hints for Irrigators"; and H. A. Craig on "Irrigation and Live Stock." Mr. Peters outlined plans whereby the association could float debentures to raise the cost of the work of reservoir building, stating that the Government would do all possible in the selection of proper sites, indeed had already made several surveys towards this end.

The place of meeting for the 1917 gathering of the Western Canada Irrigation Association came in for considerable discussion, and it was decided to invite the convention to come to Maple Creek. Maple Creek had never yet had the honour of entertaining this gathering, and now that the conventions were upon a strictly business basis, it was felt that the town could fittingly extend invitation for the 1917 congress. A delegation headed by Hon. President D. J. Wylie, M.L.A., was nominated to attend the Kamloops convention and put forward strongly the claims of Maple Creek in this connection.

The following slate was elected for the ensuing year:

President: -	GEORGE STEWART, Maple Creek.
First Vice-President:	I. H. WILLIAMS.
Second Vice-President	W. A. BURTON.
Secretary-Treasurer	G. S. HERRINGER, re-elected.
Executive: -	L. E. RICHARDSON, D. KEARNS, J. STEWART, A. S. UNSWORTH, D. DRINAN, J. M. SPANGLER, C. ARMSTRONG, C. PEARSE, W. BABBINGTON.

INTERNATIONAL IRRIGATION CONGRESS

There has been no meeting of this body since our last convention at Bassano in November, though preparations are under way to hold the twenty-third session at El Paso, Texas, in September.

In a letter, dated July 13th, written by Secretary Hooker to Calgary, he says:

"At present things are moving along normally here but the Mexican situation grows more intense as time passes, and I fear that it is only a question of time before there is serious trouble. However, we are hoping for the best.

"Although definite dates for the Irrigation Congress have not yet been set, the meeting will undoubtedly be held some time between the 10th and 20th October. You will be interested to know that President Wilson has set aside a week, free from other engagements, to come out and dedicate the Elephant Butte Dam, if public affairs at that time permit. It is needless to say that we are looking forward to a great meeting and hope that you and a good delegation from Canada will be able to attend."

A full report on the 22nd International Irrigation Congress, held in California, will be found in our last annual report.

SIXTH ANNUAL MEETING, OREGON IRRIGATION CONGRESS, PORTLAND, OREGON

No invitation this year was sent to us by the Oregon Irrigation Congress, and no delegation, therefore, attended. I understand that this meeting was purely a business one, affecting state matters only, which is doubtless the reason of our lack of invitation. Delegations from this association have attended the Oregon Irrigation Congresses for the past two years.

PUBLICITY SECURED

The following addresses were placed during the year with papers and magazines through the West, as well as many small newspaper items and articles too numerous to detail.

Special Articles:

"Domestic Science Training for Farm Girls," by Miss Marjorie M. Goldie, Campbell's Scientific Farmer, Billings, Montana.

"Grading up a Dairy Herd," by G. H. Hutton, Saskatchewan Farmer, Moose-jaw, Saskatchewan.

Address by the Honourable Duncan Marshall, Farmers' Magazine, Toronto.

"Agricultural Education in Alberta," by Dean Howes, Canadian Countryman, Toronto.

Address by G. R. Marnoch, President, Lethbridge Board of Trade, Grain Growers' Guide, Winnipeg.

"Growing of Alfalfa in Alberta," by Don H. Bark, Farmers' Advocate and Home Journal, Winnipeg.

"Alfalfa," by Don H. Bark, Farm and Ranch Review, Calgary.

"The Work of the Western Canada Irrigation Association," by F. H. Peters, Farm and Ranch Review, Calgary.

"Wise Men No Longer Pray, etc.," Fruit and Farm, Vancouver, illustrated, and with 280 papers (Patent insides) in Saskatchewan and Alberta. 500 words. (Exhibit attached.)

"Kamloops, The Place in the Sun," Farm and Ranch Review, Calgary, and Kamloops Standard-Sentinel, Kamloops, B.C.

"The Convention City," Western Standard, Calgary.

General Publicity:

We are indebted to the Kamloops Board of Trade for the loan of 15 cuts, illustrating the city and vicinity, which have been used in advertising the convention.

Thirty cuts were made for publicity purposes and have been running for the past two months in the British Columbia, Alberta and Saskatchewan papers.

The following papers regularly carried our publicity matter:

The Journal, Ashcroft, B.C. (weekly).
The Advertiser, Armstrong, B.C. (weekly).
The Mail, Bassano, Alberta (weekly).
The Bulletin, Brooks, Alberta (weekly).
The Review, Creston, B.C. (weekly).
The Call, Gleichen, Alberta (weekly).
The Standard, Kamloops, B.C. (semi-weekly).
Orchard City Record, Kelowna, B.C. (weekly).
The Sentinel, Kamloops, B.C. (daily).
Courier and Okanagan Orchard, Kelowna, B.C. (weekly).
The News, Nelson, B.C. (daily).
The Herald, Penticton, B.C. (weekly).
The Mail-Herald, Revelstoke, B.C. (semi-weekly).
The Observer, Salmon Arm, B.C. (weekly).
The Standard, Strathmore, Alberta (weekly).
The Review, Summerland, B.C. (weekly).
The News, Vernon, B.C. (weekly).
Fruit and Farm, Vancouver, B.C. (monthly).

MINUTES OF THE EXECUTIVE MEETING OF THE WESTERN CANADA IRRIGATION ASSOCIATION HELD AT FIELD, B.C., SATURDAY, APRIL 29TH, 1916

A meeting of the Executive was held on Saturday, 11 a.m., April 29th, 1916. Present:

F. H. Peters, in the Chair.
G. R. Marnoch, Lethbridge.
R. A. Travis, Bassano.
Jas. Johnstone, Nelson.
J. L. Brown, Kamloops.
The Secretary.

Letters of regret at inability to attend were received from F. Maurice Smith, Penticton and W. E. Scott, Victoria.

The Secretary read the minutes of the last two meetings held at Bassano, November 23rd and 25th last, which were approved. The minutes of the meeting held at Bassano, November 23rd, should have been signed by William Pearce, Chairman 1914-1915, but in his absence in Ottawa and in view of the fact that two of the members at that meeting were present at Field, at the request of the Secretary and with the approval of the meeting, Chairman Peters signed them upon motion of Mr. Johnstone, seconded by Mr. Brown.

The Secretary outlined his visit the previous month to Kamloops and the formation of a Local Board of Control there with J. L. Brown as Chairman and C. E. Lawrence as Secretary. He went over the tentative programme of speakers as drawn up at the time of this visit with the help of Secretary Winslow of the B.C. Fruit

Vernon Road, Kamloops, B.C.
Good roads — Quick transportation

Provincial Buildings, Kamloops, B.C.

Growers' Association, who had kindly come to Kamloops for this purpose at request. Of 22 speakers suggested at that meeting and written to by the Secretary, 14 acceptances had been received—no refusals. The Secretary reported he had again written the balance a day or two before and would follow them up for a definite reply.

The proposed papers on "Sugar Beets as a Commercial Enterprise in Alberta," by Mr. Fryberger of the Bassano Colony and "Sugar Beets as a Commercial Enterprise in British Columbia," by P. H. Moore, Superintendent of the Dominion Experimental Farm at Agassiz, B.C., led to discussion. It was the consensus of opinion at the meeting that the title "Sugar Beets as a Commercial Enterprise in British Columbia" should be changed to read "Can Sugar Beet Growing be made a Commercial Success?" and that it would be better for Mr. Fryberger to deal with "Varieties of Crops Successfully grown under Irrigation in the Bassano Colony," and that the choice of the speaker to deal with the sugar beet proposition in Alberta be left with Mr. Marnoch and the Secretary. It was thought desirable, however, that the very fullest possible discussion should be brought out in this connection so that intending beet growers would have every possible data at their hands to help them to decide whether or not to go ahead with such a proposition.

Mr. C. E. Barnes, General Manager of the Barnes estate at Walhachin, B.C., having left for Europe, Mr. Brown was asked to get into touch with a man in his district who could best handle the subject of "The Operation of Irrigation Systems" and report to the Secretary, who would then extend the official invitation.

After a discussion of the proposed address by D. W. Strachan, Superintendent of the Sanitarium (Alexandra Ranch), Tranquille, B.C., where the convention proposes to put in one afternoon of practical inspection, it was suggested by the Secretary that Mr. Strachan read his paper while the delegates are visiting the ranch rather than in the convention hall before the visit is made. The Secretary was instructed to write to Messrs. Brown and Strachan suggesting this.

After discussion as to the subject of Mr. Peters' address, it was agreed that he should speak on "Irrigation Districts' Acts."

Mr. Marnoch was asked to speak on the relation of interest between the city and the country man, the suggested title being "The Farmer and the City Man." Mr. Marnoch asked that Mr. F. M. Black's name be coupled with his in this address, the time to be split between them.

The Official Call as proposed by the Secretary, including illustrations, lay-out, etc., was laid before the meeting and approved.

A sample badge to be worn by delegates to the convention was displayed and approved. This design was the choice of the Kamloops meeting of the month previous and is similar in shape and size to that used at Bassano last year.

New letterheads and envelopes were approved.

The designs for follow-up post cards were approved.

Mr. Brown asked if it would not be possible to issue the annual reports at an earlier date. The Secretary informed the meeting that copy for these reports reached the Superintendent of Irrigation at Ottawa in correct typewritten form ready for the printers. Mr. Peters informed the meeting that everything possible was done by the department at Ottawa to secure an early issue of these reports and pointed out that they generally came off the press prior to the month of March when the conventions

were held during the summer, but that last year the convention was held at the close of November and, therefore, the issue could not be expected much before the summer.

The Secretary submitted the financial statement showing a balance on hand on March 1st of $66.63, with $1,500.00 in grants promised. He presented his accounts and asked that they be audited. Chairman Peters reported to the meeting that he checked the monthly bank statement with the Secretary's statement each month and signed all cheques with the Secretary, and in his opinion such an audit was not necessary. It was moved by Mr. Marnoch and seconded by Mr. Brown that the financial statement as presented be accepted.

The Secretary presented an estimated statement of expenses for the Kamloops convention of $1,070.80, these figures including the grant of $500.00 to the Kamloops Local Board of Control. Mr. Brown did not think that $500.00 would be sufficient for their purposes and stated that the city had approached the British Columbia Government for a further grant. Mr. Brown stated that when the convention was held there in 1910 the Government had granted them $2,000.00 for this purpose. The meeting adjourned at 12.30 p.m. for lunch, resuming session at 2 o'clock.

The Secretary presented his statement of publicity matter issued during the past few months.

The status of the association's movement to induce tree planting on the prairies was explained. A list containing 1,000 names of irrigators in Southern Alberta and the Cypress hills, had been furnished the Chief of the Division of Tree Planting, Mr. Norman Ross, Indian Head, at his request. This list had been returned, after being checked over, with the information that 180 names only on such list had received the Government's tree planting bulletins and that Mr. Ross would write the Director of Forestry at Ottawa for permission to forward to Calgary 820 bulletins to be issued to the balance of the names on the association's list. Mr. Johnstone pointed out that what was wanted was a utility tree such as an ash and suggested that Mr. Fairfield be communicated with regarding the matter.

The Secretary read the Notice of Amendment under Article VII., Clauses 9 and 17, the amendment providing representation for the Comptroller of Water Rights of British Columbia, one delegate from the Water Rights Branch of the Department of Lands, British Columbia, the Chief Engineer of the British Columbia Hydrographic Surveys, the Dominion Superintendent of Irrigation and the Dominion Superintendent of Water Powers.

The matter of the payment of expenses of Executive members to the annual conventions was brought up by Mr. Johnstone, who was under the impression that this had been done previously. It was explained by the Chairman that while the expenses of the Executive to Executive meetings had been met whenever funds permitted, it had never been the custom to pay the expenses of the Executive to the annual conventions. Mr. Johnstone stated that he raised the question to be properly informed regarding it, and that he was satisfied to let the matter stand.

It was moved by Mr. Brown and seconded by Mr. Johnstone that the Secretary and Chairman be instructed to approach the proper Canadian Pacific Railway officials with a view to securing permission for delegates to the Kamloops convention to return eastwards via the alternative Canadian Pacific Railway route (Revelstoke, Nelson and the Crow). Carried.

The status of the five resolutions passed at the recent convention was discussed.

Resolution No. 1. Mr. Peters reported that the work of irrigation surveys in Southern Alberta was being prosecuted as actively as possible.

Resolution No. 3, the continuance of gauging streams. Mr. Peters reported that this work was being carried on without any delay.

Resolution No. 4, the International Irrigation Congress at El Paso, Texas. The Secretary advised the meeting that he had no communication whatever from Mr. Hooker and was instructed to write and ask Mr. Hooker to place this association on his mailing list so that we might be informed of the work of the International Irrigation Congress as fully as possible.

Discussion ensued regarding the settlement of the irrigation dispute between the farmers in the Canadian Pacific Railway Irrigation Block, Western Section, and the Canadian Pacific Railway, and a suggestion was made that a resolution be drawn up expressing the satisfaction of this association with such settlement. Mr. Marnoch suggested that this be left over until the Kamloops convention. Mr. Johnstone stated that in talking with the late President Speakman of the United Farmers of Alberta, on the way to the convention at Bassano he found that gentleman very strongly prejudiced against the railroad corporation but on his return with him, after the convention, Mr. Speakman's attitude was very much changed. Mr. Brown remarked that if some sort of resolution was put through by this meeting it might induce certain farmers who were hesitating about signing up, to do so, and after further discussion the following resolution proposed by Mr. Marnoch and seconded by Mr. Brown, was unanimously carried.

"That the Executive of the Western Canada Irrigation Association in session at Field, B.C., April 29th, is glad to learn that since the very full discussion at the 9th annual convention of this association held at Bassano, last November, of the difference between the irrigation farmers in the Gleichen district and the Canadian Pacific Railway, a better understanding has been brought about through the good offices of President H. W. Wood of the United Farmers of Alberta and President F. M. Black of the Calgary Board of Trade."

The Secretary was instructed to send copies to Presidents Wood and Black.

There being no further business the meeting adjourned after a hearty vote of thanks to the Chairman.

NORMAN S. RANKIN,
Secretary.

In accordance with Article X. notice of motion of the following proposed amendments will be moved at this annual convention.

1. To add after paragraph 9, Article VII., Section 1, two new clauses as hereunder:

"The Comptroller of Water Rights of British Columbia and one delegate from the Water Rights Branch of the Department of Lands."
"The Chief Engineer of the British Columbia Hydrographic Surveys."

so that this paragraph will now read as follows:

"The Dominion Commissioner of Irrigation and two delegates, one from the Irrigation Branch and one from the Hydrographic Surveys Branch of the Irrigation Department.

The Comptroller of Water Rights of British Columbia and one delegate from the Water Rights Branch of the Department of Lands.

The Chief Engineer of the British Columbia Hydrographic Surveys."

2. To add to paragraph 17, Article VII., Section 1, the words

"The Dominion Superintendent of Irrigation and the Dominion Superintendent of Water Powers," so that this paragraph will now read:

"The Dominion Superintendent of Irrigation, the Dominion Superintendent of Forestry, the Dominion Superintendent of Water Powers, and the Chief Forester of British Columbia."

This motion was included in the "Official Call" and was received by the Secretary more than a month prior to the date of this convention. It is, therefore, in order for discussion before this meeting.

GOVERNMENT GRANTS

The association is indebted to the Dominion Government for a renewal of their grant of $500.00 and to the Alberta and British Columbia Governments for like amounts, and as this convention is being run on the most economical basis possible, your Executive trusts to come through the season with a financial balance on the right side. Below is a statement of the cost of the Bassano convention, which of course, does not include working expenses for the period between conventions, stamps, Executive meeting at Field, etc., etc.

Transportation, expenses of speakers to convention including Secretary and assistant	$ 53.80
Printing, badges, official calls, cuts, photographs, engravings, etc.	373.40
Stenographic report including hotel and expenses	177.00
Cash awards for agricultural exhibits	198.00
Printed prize-lists, signs, cartage of exhibits and other details in connection with exhibition	113.25
TOTAL	$915.45

The cost of the Kelowna convention in 1912 was $1,615.95; and of the Lethbridge convention the following year, $1,514.64.

ESTIMATED COST OF KAMLOOPS IRRIGATION CONVENTION

250 badges (ribbons already in hand)	$ 20.00	
2,500 sheets Certificates of Appointment (three on sheet)	25.00	
2,500 official calls, including four cuts	100.00	
Art work	$10.00	
3 half-tones, 4½" x 5" cuts	12.50	
2,500 large envelopes (No. 10)	25.00	
1,000 small envelopes	7.00	
		$ 177.00
4 follow-up post cards—2,300 of each	$ 46.00	
Designing and drawing at $5.00 each	20.00	
4 half-tone cuts, 3½" x 5¼" at $3.20 each	12.80	
		78.80

3,000 letterheads (zinc engraving)	$ 30.00	
10 cuts for advertising purposes	25.00	
Estimated expenses of two outside speakers at $80.00 each	160.00	
		215.00
Kamloops, for local expenses	$500.00	
		500.00
Estimated expense of Field meeting	$100.00	
		100.00
		$1,070.80

Income:

Alberta Government Grant	$500.00
Dominion Government Grant	500.00
British Columbia Government Grant	500.00
Balance on hand	66.63

Financial Statement

WESTERN CANADA IRRIGATION ASSOCIATION, 1915-1916

November 25th, 1915, to July 28th, 1916

Receipts

1915–Balance carried forward as per bank account		$ 710.23
Refund on sleepers used at Bassano convention by C.P.R.		25.00
1916–Grant from the Dominion Government	$500.00	
Grant from the Alberta Government	500.00	
Grant from the British Columbia Government	500.00	
		1,500.00

Expenditures

1915–Premium list, Bassano Exhibition	$208.00	
Lunch expense at Bassano Dam for delegates	17.00	
Stenographic Report and expenses	177.00	
Cartage and signs, Exhibition, Bassano	13.25	
Expenses Vice-President Dunham, U.F.A. from Lethbridge to Bassano and return as speaker	11.00	
Expense of sleepers C.P.R., Bassano, during meeting	30.80	
Printing, stationery, etc., local expenses	13.25	
1916–Printing, photos, cuts, badges, post cards, letter heads, official calls, general advertising expenses	249.80	
Grant to Local Board of Control, Kamloops	500.00	
Expense executive meeting at Field, B.C., 29-4-'16	39.30	
Secretary's salary	333.28	
Emergency cheque for expenses (working) at Kamloops to be accounted for	100.00	
Expenses of meeting Permanent Secretary and Local Secretary, July 22nd, for final arrangements convention	14.70	
Miss Allen—Special stenographic work	25.00	
Balance in bank this date	502.85	
	$2,235.23	$2,235.23

Certified correct,

NORMAN S. RANKIN,
Permanent Secretary.

Calgary, July, 1916.

MEMBERS TAKE THE KING'S UNIFORM

The advertising follow-up post card issued by your executive this season stating that "Irrigation produces Patriotism," pretty well hit the mark, as there is no doubt many of our delegates are with the overseas forces. I regret that I have no record of the names of these men, but hope to secure them at a later date; at present I can therefore only make mention of one or two of those who have been most prominent in our work as members of your executive.

W. C. Ricardo, one of the original members of this association and a past President, left for the front early this year, while our past Vice-President, Dr. C. W. Dickson, is enlisted with the 172nd Battalion, quartered in this city at this time. Along with Captain J. C. Dufresne and artilleryman Arthur Chamberlain, of last year's Executive, the association wishes these men "God Speed" and a safe and early return; they have worked actively and enthusiastically in the cause of irrigation, and we shall not quickly forget them. Western Canada cannot afford to lose men of this calibre. They are needed in our irrigation "firing line," where we hope to see them again in the earliest possible future.

DEPARTMENT OF THE INTERIOR

CANADA

IRRIGATION BRANCH

OTTAWA, July 7, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Calgary, Alberta.

DEAR MR. RANKIN,—I received your telegram of the 6th inst. as follows:

> "I hope reports nineteen-fifteen annual meeting Western Canada Irrigation Association will be ready for distribution by time this year's convention at Kamloops, July twenty-fifth to twenty-seventh. If so, please send three hundred copies direct to Kamloops. Very necessary should be available. Please wire answer."

to which I have replied to-day as follows:

> "No prospect of report being completed by July twenty-fifth. Progress very unsatisfactory. Regret delay, but cannot hasten delivery. Writing."

I very much regret the unsatisfactory progress that is being made in connection with the printing of the report of the Bassano convention held in November, 1915. The report was received from you very promptly, under the circumstances, and was transmitted by me to the King's Printer, without delay. The subsequent arrangements were, of course, beyond my control. I have done all that I can to expedite the printing and delivery of the report, but fear that we must expect a good deal of delay. I am led to believe that it may be early autumn before the report is finally delivered.

Yours very truly,

E. F. DRAKE,
Superintendent of Irrigation.

DEPARTMENT OF THE INTERIOR
CANADA
IRRIGATION BRANCH

OTTAWA, July 10, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Calgary, Alberta.

DEAR MR. RANKIN,—With further reference to my letter of the 7th inst., I am enclosing, for your information, a copy of a memorandum which I have just received from the officer who has charge of departmental printing. You will note from this that I had taken up with him the question of early delivery of this report before the receipt of your telegram of the 6th inst., and you will find his reply bears out my statements to you.

Yours very truly,
E. F. DRAKE,
Superintendent of Irrigation.

DEPARTMENT OF THE INTERIOR

OTTAWA, July 8, 1916.

Memorandum.

MR. DRAKE,—I have your memorandum of July 4th, asking as to the possibility of getting 500 copies of the report of the Western Canada Irrigation Association delivered at Kamloops by July 25th.

On receipt of your memo., I had the Superintendent of Outside Printing wire the printers and made enquiries as to whether the printers had as yet been delivered the paper stock. After careful consideration, we find it will be impossible to make delivery of any copies for some time to come. We expect that the whole report will be signed for press very shortly, but the big factor in the delay may be the getting of the paper stock. War conditions seem to have upset the paper manufacturers to such an extent that it now takes months to get stock that formerly could be secured promptly on short notice.

H. W. LEGGETT.

VICTORIA, July 24, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Kamloops.

DEAR MR. RANKIN,—I am very sorry to have to tell you that I find it will be quite impossible for me to be present at the irrigation convention.

The Minister is away, and both Mr. MacDonald and Mr. Winslow, heads of the Live Stock and Horticultural Branches of this department, will be in attendance at the convention. It would not do for me to leave also, as there would be no one left in the office to attend to important matters which are constantly cropping up. I will, therefore, have to forego the pleasure of being present.

I can assure you that it is a very great disappointment to me. I had intended up to the last moment to go, but I consider that as I have attended every meeting of this convention for some years, it would be better if Mr. Winslow and Mr. MacDonald were to have their turn. They will, I am sure, ably represent this department.

I hope that you will have a very successful meeting, and that everything will go off well. With best regards,

Yours very truly,
WM. E. SCOTT,
Deputy Minister.

REGINA, Sask., July 18, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Calgary, Alta.

DEAR SIR,—With reference to your wire of the 17th inst. reading:

"Trust you will be able to attend Western Canada Irrigation Convention at Kamloops, July twenty-fifth next. If impossible, the Executive will appreciate your sending personal representatives."

I sent a reply message as follows:

"Regret Minister unable attend convention. Will be represented by Deputy Auld."

which I wish to herein confirm.

Mr. Motherwell has engagements in Regina during next week, which will preclude the possibility of his attending your convention, much as he would like to be with you on this occasion. Mr. Auld will reach Kamloops on the morning of the 26th, and will remain for the two final days of the convention.

Yours very truly,

I. J. CUMMINGS,
Secretary.

VICTORIA, B.C., July 25, 1916.

NORMAN S. RANKIN,
Western Canada Irrigation Convention,
Kamloops, B.C.

Owing to important matters in hand, impossible to attend convention.

WILLIAM YOUNG,
Comptroller of Water Rights.

VICTORIA, B.C., July 25, 1916.

NORMAN S. RANKIN,
Secretary, Western Canada Irrigation Association,
Kamloops, B.C.

Regret sincerely that owing to absence of Minister and important matters requiring my attention here, I shall have to forego pleasure of attending convention of Western Canada Irrigation Association. My best wishes for a successful and profitable time. Am sure Local Board of Control will look after delegates well and show them the many attractions and points of interest of Beautiful Thompson valley.

WM. E. SCOTT.

MR. N. S. RANKIN,
P.O. Box 1317,
Calgary, Alta.

SAN FRANCISCO, June 28, 1916.

DEAR SIR,—Your invitation to be present at your association's congress received.

I much regret that I cannot attend. I have already arranged for an extended trip which will occupy all my time from early in July to well into August. Had I known your dates earlier I could have attended.

I wish your convention, and your association, every success.

Yours truly,

NIEL NIELSON,
Commissioner.
Australian Trade Commission to America.

NN-ACG.

VICTORIA, July 19, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Association,
Calgary, Alta.

DEAR MR. RANKIN,—I beg to acknowledge the receipt of your telegram under date of the 17th inst., relative to my taking the Chair at the Kamloops convention on the 25th of July.

I regret very much indeed that it will not be possible for me to be with you on the date mentioned, as I am leaving immediately for Prince George and expect to be absent for some time. I have been living in hopes right along that matters might be arranged in such a way as to make it possible for me to attend the convention, and needless to say, I am rather disappointed.

I trust you will convey to the different delegates my deep regrets at not being able to attend, and I hope that the efforts of yourself and associates may result in the most successful convention on record.

Yours very truly,

WM. R. ROSS,
Minister of Lands.

NELSON, B.C., July 25, 1916.

CHAIRMAN IRRIGATION CONVENTION,
Kamloops, B.C.

Accept best wishes for success of your session. After recent tour through dry belt am greatly impressed with its immense agricultural possibilities with proper development of irrigation.

WILLIAM MANSON,
Minister of Agriculture.

VICTORIA, B.C., July 20th, 1916.

NORMAN S. RANKIN,
Secretary, Western Canada Irrigation Association,
Calgary.

Your letter Seventh received. Have made my plans to go to Kamloops, but there have been so many calls upon my time this season that I cannot be certain. Better have an extra speaker available.

WILLIAM YOUNG.

PENTICTON, B.C., July 22, 1916.

NORMAN S. RANKIN, ESQ.,
Secretary, Western Canada Irrigation Convention,
Kamloops.

DEAR SIR,—I very much regret to say that the claims of my orchard, where I am alone on 20 acres, will prevent my attending the convention. I hoped to have been able to arrange matters so that I could get away this week, but I find it to be impossible.

Wishing your meeting every success,

I am,

Yours truly,

F. MAURICE SMITH.

CALGARY, July 6, 1916.

R. J. C. STEAD, ESQ.,
Calgary.

DEAR MR. STEAD,—Mr. Norman Rankin was good enough to put me on the list of speakers for the irrigation convention at Kamloops in company with Mr. Marnoch. I demurred at the time as I considered it unlikely that I could be in Kamloops at that time.

Possibly you are looking after Mr. Rankin's work in this direction, and if so, will you please note that I have to leave for the East about the middle of the month and shall most certainly miss the convention at Kamloops. This I regret very much as it is always a pleasure for me to visit British Columbia, but as the excuse is a good one, no doubt you will be able to render it gracefully to the powers that be.

Thanking you in anticipation,
Very truly yours,

F. M. BLACK,
President.

FMB-AM.

OTTAWA, July 11, 1916.

C. E. LAWRENCE, ESQ.,
Local Secretary, Convention of Western Canada,
Irrigation Association,
Box 204, Kamloops, B.C.

DEAR SIR,—I have your favour of the 6th inst., inviting me to attend the tenth annual convention of the Western Canada Irrigation Association to be held at Kamloops from the 25th to the 27th inst.

I may say that up to recently I have had this convention in mind and had been hoping that it would have been possible for me to attend. I am very sorry to say, however, that I have since found that circumstances make it impossible for me to be in the West at that time, so I am obliged to defer this anticipated pleasure until another year.

The Superintendents of some of our Branch Farms in the West have been authorized to be present at the convention, and I am sure our Farms will be well represented.

Hoping that there may be a very successful gathering, I am,
Yours very truly,

J. H. GRISDALE,
Director.

EDMONTON, July 9, 1916.

C. E. LAWRENCE, ESQ.

DEAR SIR,—I thank you very much for your kind invitation to attend the convention of the W.C.I.A. I only wish this had been possible, as I am greatly interested in irrigation and have seen something of it in many parts of the world. I greatly regret to say, however, that it is not possible as I am travelling from province to province on a fixed programme, and, in fact, am not my own Master.

Thanking you heartily, and wishing all success to your efforts,
Believe me,
Truly yours,

H. RIDER HAGGARD.

OTTAWA, July 4, 1916.

C. E. LAWRENCE, ESQ.,
Secretary, Local Board of Control,
Western Canada Irrigation Association,
Kamloops, B.C.

DEAR MR. LAWRENCE,—I have received a copy of the Official Call of the Western Canada Irrigation Association issued in connection with the tenth annual convention which is to be held at the city of Kamloops on July 25th and following days.

I hardly expect to be able to attend the convention myself, but I am glad to be able to inform you that Hon. Dr. W. J. Roche, Minister of the Interior, has kindly agreed to have the proceedings of the tenth annual convention of the association printed free of cost to the association, in the same manner as in former years, provided, of course, that the association desires this to be done.

Dr. Roche has had the honour of being Honorary President of the association for the past three years, and has always taken a very keen interest in the valuable work which the association has done and is attempting to do.

Yours very truly,

E. F. DRAKE,
Superintendent of Irrigation.

EDMONTON, ALTA., July 22, 1916.

NORMAN S. RANKIN,
Natural Resources, C.P.R.,
Calgary, Alta.

Regret that I will be unable to attend Kamloops convention. Mr. James McCaig and E. A. Howes will represent the Department of Agriculture at the meeting.

DUNCAN MARSHALL.

CALGARY, Alta., July 25, 1916.

THE CHAIRMAN,
Western Canada Irrigation Convention,
Kamloops, B.C.

Regret exceedingly pressing work which I find here on my return to-day from Montreal prevents the possibility of my attending the Kamloops meeting. I trust that you will have a most successful meeting and that your deliberations will assist the great work of irrigation development in the West.

J. S. DENNIS.

OTTAWA, Ontario, July 17, 1916.

C. E. LAWRENCE, ESQ.,
Secretary, Local Board of Control,
Box 204, Kamloops, B.C.

MY DEAR SIR,—In my Minister's absence, permit me to acknowledge your favour of recent date, inviting him to be present upon the occasion of the convention of the Western Canada Irrigation Association. Dr. Roche is at present on his way to the Yukon, and I fear will be unable to return in time to be with you. May I, in his behalf, however, express his appreciation of your invitation.

Yours sincerely,

J. G. MITCHELL.

DEPARTMENT OF THE INTERIOR,
July 17, 1916.

N. S. RANKIN, ESQ.,
Permanent Secretary,
Western Irrigation Association,
Calgary.

MY DEAR MR. RANKIN,—I am in receipt of yours of to-day's date inviting me to attend the annual meeting of your association at Kamloops, B.C., at the end of this month.

I regret that my arrangements will not permit the pleasure of accepting your kind invitation.

I hope that Mr. Drake, Mr. Campbell and other of our officers will be present, and that you will have a very successful meeting.

Wishing your association continued success, I am,

Yours very faithfully,
W. W. CORY,
Deputy Minister.

CHAIRMAN: Might I ask to have the report adopted by the convention.

CHAIRMAN: I declare the report to be adopted.

The next speaker is Mr. James White, Commission of Conservation, Ottawa. I think Mr. White is so well known to the majority of the delegates of this convention that it is unnecessary for me to say anything further in introducing him to the delegates.

MR. WHITE: Mr. President, Ladies and Gentlemen,—I do not propose to take up much of your time to-day. I only received notice that I would be called upon to address this convention a few minutes ago.

In speaking to you to-day, my thoughts go back to some six years ago when I attended your first convention. That occasion was the time I made my first public address. Necessarily, being only a few months after I had organized our department here, it was an address largely of promise, but now I am glad to be able to say that we look back upon six years of achievement. We have not been able to do very much in the way of irrigation, but the blame, I think, must be laid at Mr. Peters' door. We have, however, been able to do some work in agriculture of interest to those engaged in agricultural work. The principal work being carried on is in connection with our illustration farms, one of which is established near your city on the North Thompson river. In undertaking that work we did as we usually do. Another organization having taken it up we later took it off them to demonstrate to the farmer that if he would only follow our instructions he would achieve similar results as achieved by our department. In other words, we take the experimental farm to the farmer. After having done that we turn the work over to the Department of Agriculture which, as you know, has voted $10,000,000 towards the promotion of agriculture and are carrying it on and with their resources they could establish as many farms in the province as we have in the Dominion.

Then we have taken up the question of what we shall do with the returned soldiers. We have taken up the question of farm labour. That is a condition always with us and usually acute in the prairie provinces during the harvest seasons and in

Irrigation Flume

Bridal Veil Falls, Kamloops, B.C.

the East it is with them all the time. We have taken up some counties as typical and have gone through them to ascertain the conditions and find out if the conditions there are as told to us and whether it is acute and whether it will last throughout the whole season or only at certain seasons. We have taken that up in a general way and it will be thoroughly discussed in the autumn at Ottawa, when Sir George Foster returns.

I will not take up any more of your time, but on behalf of the Commission of Conservation will wish you God-speed in your work. (Applause.)

CHAIRMAN: The next item is an address by the Honourable Duncan Marshall, Minister of Agriculture for the province of Alberta. He, however, has found it impossible to be here. He has sent us Mr. James McCaig, of his department, to represent him. Mr. McCaig is an author of a text book which has been of inestimable value to farmers who have taken it up.

MR. MCCAIG: Mr. Chairman, Ladies and Gentlemen,—It was not my expectation to say a great deal of anything at this convention to-day. I have seen a copy of your programme and have seen the names of those associated with the work and it appears to me that it would be presumption on my part to attempt to take any considerable part in the programme. I have, however, felt some satisfaction in having been asked by Mr. Marshall to come to Kamloops to-day to express his regrets at his not being present himself.

Mr. Marshall takes a good deal of interest in conventions of this sort and is a good man at conventions, and, as you know, he took a considerable part in the conventions last year. It has, however, not been possible for him to be here at this time of the year. Neither was Mr. Craig able to come. They asked me if I would go and present their apologies for their not being here. That is as far as I can really go. I wish to assure you that Mr. Marshall's interest is sincere and sound and he expressed keen regret at not being able to be here.

The matter of irrigation in Alberta is firmly under the control of the Dominion Government and the matter of irrigation is so large that being a Dominion interest it has not appeared that the Provincial Government has much to do with the irrigation concerns. Likewise, the corporations looking after irrigation are strong corporations and they are able to build up strong communities which are able to look after themselves pretty well, consequently, it does not appear that the people using irrigation require so much help as those in this province where they are working single-handed. At the same time the province of Alberta has a method in which smaller corporations formed for irrigation purposes are helped; further, our Government gives support to irrigation undertakings and enterprises of that nature.

The irrigation question is taking a strong hold in the province and where the people are susceptible to new ideas and where performance follows quickly upon the heels of thinking, it seems our function to do educative work and consequently it seems that we are doing the right thing in fostering conventions of this kind. At the same time, the Minister, I may say, is directly interested in irrigation farming and your men who are working on the engineering side are likewise realizing that the agricultural problem is one of the great problems to deal with. The engineer has started something, but the farmer has a lot yet to do. The man who does not

know much about watering, does not know much about irrigating. The problems in our province to-day are not so much problems connected with engineering, but are rather questions of direct irrigating. The acre returns and the heightening of the precious qualities are something that the farmer should see to.

I am not authorized to make any announcement as to something else our department would like to do for those in Alberta. I may say, however, that being an easy talker I can go as far as saying that there will come a time in the province of Alberta when the Department of Agriculture in furnishing education to boys and girls in that province will go much further than it has at present. After the great days of the war are over and we get back to the good old times and the money is better, the direct efforts of the department and the Board of Agricultural Education will double the grade of training which we now have for the boys and girls in our agricultural schools. If I were in an irrigation district it would be my interest to go to the Minister and impress upon him that when he starts a new school in an irrigation district, it should be an irrigation education that is given at that school. I am not speaking authoritatively. I am just tipping you off as it were. I think we can be of substantial use to the people of Alberta, and we would like to see them selling their alfalfa in the province of Alberta at a greatly increased price, instead of sending it away to the other provinces.

If I were the Honourable Mr. Marshall or if I were the other speakers, I think I would be trying to tell you about something we are attempting to do. Independently of irrigation, it has appeared to the department that in the matter of meeting the obligations of times like these, as Nellie McClung says, "our primary function is education." We have some twenty branches in our department made up amongst others of live stock, poultry, farms, schools and public health and two or three other branches and public liabilities. It does appear to me that at the present time the key-note of our conversation is education. We think the greatest thing before the coming generation in this country is the linking up of educational efforts for the social and economic importance of the rural institutions and on that account our effort at the present time is educative.

We have an object lesson in southern Alberta. Between the two irrigation districts we have a demonstration farm in the dry country between Calgary and Lethbridge, at Claresholm, where we have jumped past the grain farm altogether. We have jumped past the man who raises fodder and grain and sells it all, to the type of farmer who produces on 300 acres, 100 acres of cultivated crop and something in food; 100 acres of fodders and grasses and 100 acres of feed grain and that supports 40 to 50 head of live stock. I want to say that at this time our department is working hard in the matter of rotating crops. We tell them about individual enterprise; somebody tells them about horses; others tell them about dry farms. We have come now to a point where we feel that the people will want to look upon a type of agriculture and criticize the type of farming in which a man is engaged in a certain district and we have illustrated in the dry country that it is possible to work out an enterprise that is of the highest and best type of agriculture. Probably next year will not be as moist as this year, but we have a man in charge who will get just as good results as he has this year. Last year at Medicine Hat we took over 200 tons of succulent grasses in the middle of winter. Good cattle require a lot of this stuff. We have to get our concentrated food and fodders and we have likewise

to get our succulent feed. We feed over one hundred tons of silage on our Medicine Hat farm and in case of dry times we have that succulent feed in summer days. We have silos on all our demonstration farms. We believe that by demonstrating those things on our farms we are doing good educative work.

Now you people of British Columbia have beautiful pockets of land. Even coming this far through your province we have seen some good settlement. You necessarily have rather a good idea of intensified farming. While coming along one place near here we saw them drying hay on the clothes lines. That is the most up-to-date type of dry farming. (Applause.) Just by contrast I want to say that we are accepting our conditions in Alberta as we find them. We are not sitting in our car windows like so many commercial travellers from the East and saying that the farmer has too much land and saying that he is far better off with eighty acres of land than 320 acres. Those people tell it all in a minute after a glance through the car window. Just imagine how much these shoe travellers and bankers can see. The bankers for instance are trying to tell the farmers all about agriculture. They are all trying to tell the prairie farmer to cut his farm in three pieces. But we are not doing our work that way. We are taking things as we find them. We say, here is an economic condition in which men are doing pioneer work without too much capital. They require crops on short notice. We likewise look at those who go in for grain growing. Our investigations have shown that the residue of straight profits in grain growing is not much. A man on a quarter-section of land cannot support his family and his hired help on a straight grain growing proposition. We recognize that he has to have quite an amount of cash before he can get into the growing of succulent feed and other cash crops. We say, if a man has a half-section he is in better condition to do economical farming than the man on the quarter-section, in spite of the fellows who are looking out of the windows; that he is in a better position to make a profit on a half-section than on a quarter-section. A man on a quarter-section cannot farm on the scale that the man on the half-section can. There is another feature in production and that is the cost of machinery. We find it far better to spread it over half a section than a quarter-section. We say, here are the three factors of production. The land; the average price of land in Alberta is only $10 or $11 an acre. Here is labour; costs like anything and on a quarter-section one man would be required from six to ten months altogether. Then machinery; that must be given considerable thought. Those are the three factors that enter into production on a farm.

If labour is high is it not worth while to concentrate that and get the most out of it? If machinery is high, we should get along on what we can get cheap. Get enough land and get enough labour so that you will be able to go over it effectively and get enough land to make it worth while. To illustrate: Two men came out as homesteaders some years ago. Between them they had plenty of cattle. They settled right beside one another and by working the half-section as a one-farm proposition they have forged ahead and become rich. There is a half-section proposition with two men to work it instead of a quarter-section where you have to hire a fellow at three different prices during the year.

We are telling the man over in Alberta that even if he has all the varieties of weeds including mustard and stink weed, he can go on farming. We do not tell him that he has to get down and farm on a smaller area. We tell him to get gradually

into the type of farming that will enable him to clean his farm. When I was down on the farm at Claresholm there was a man ploughing with a four-horse team and at the same time a flock of sheep grazing in the field making a pound a day or ten cents a day to the farmer. That is our idea of farming where you have weeds. We think it is better to do that than to go broke.

I just say these things to invite your attention to problems of farm management and to bring to your notice economical conditions as we find them in Alberta. I believe that while we can do a lot of things in the way of individual accomplishment, on some things it is necessary for us to stand to one side and take a look at our propositions and see the aspect from a general view.

With regard to this automobile road from Kamloops to Edmonton. I would like to see this road finished. We look upon British Columbia as a kind of wayward neighbour. We are closer to British Columbia than Saskatchewan in a sense. We get all our fruit from British Columbia and if I might throw out a suggestion there about packing the fruit, I would say, that you must employ very small boys or wise men because I have often noticed that there is a fine display of large ripe fruit on top of the box, but beneath that there is apparently fruit that they wish to hide from view as much as possible. If we were to get together we might be able to help out each other in matters of this kind.

Now, ladies and gentlemen, with respect to some of these matters, we are trying to do the best we can in Alberta. We appear to be on a great prairie over there that keeps us in a purely agricultural occupation. There is enough gambling to it, but I do not think there is the sporting spirit in our province as you have it here. I do not think we look upon the bright side of things over there as much as you do here. One time in going through Alberta I came across a piece of oats. They were real good oats I thought, 80 to 120 bushels to the acre. I came across the field and said to the farmer, "There is a pretty good crop of oats." "No," he said, "that is not an extra good crop. I have seen a good many better ones." I said, "It looks good to me." "Well, no," he replied, "it is not as good as I have seen." I went on to the next field and looking at the good crop I said, "Here is a big crop of oats." He said, "Well, yes, but these big crops of oats are mighty hard on the land." On the other hand, I looked upon the fellow trying to hoe potatoes on the side of the hill in British Columbia and he had a mighty hard time, let me tell you, keeping on the side of that hill. I said to him, "That is a pretty hard spot to make a living on." He looked around and answered, "No, it is a pretty good one." "It looks pretty rough and steep to me," I remarked. "Well," he replied, "I have no fault to find with it, for I have only fifty acres of this sort of land, but the next fellow has got 100 acres." I think that type of man would be more of an asset to the province of Alberta than he would be to British Columbia.

I shall not take up more of your time. We are trying to do the best we can in Alberta. We are trying to do the best in agriculture with regard to improving social and economic conditions. The Chairman was good enough to mention the fact that I had produced a text book for the province of Alberta. I do not say this as a matter of pride. I am glad that I have been of any help at all in agriculture. I may say though that there is no place that I would rather have the approval of good men and women than in the province of British Columbia. (Applause.)

CHAIRMAN: After the very interesting address which we have had from Mr. McCaig, I think we will now call upon Miss Jessie Brown to favour us with a solo.

Miss Brown then sang "Somewhere in France," which was received by the convention with such hearty applause that she sang as an encore, "Somewhere a Voice is Calling." (Applause.)

CHAIRMAN: After the very excellent singing we must tender to Miss Brown a vote of thanks of this meeting for entertaining us in this way. (Loud Applause.)

CHAIRMAN: I will now call upon Mr. A. S. Dawson of Calgary, chief engineer of the Department of Natural Resources of the Canadian Pacific Railway, who will speak to us in the place of Mr. J. S. Dennis, who is down on the programme for an address. All those who have visited Bassano will know what an excellent piece of work Mr. Dawson has done down at the dam at that place, as engineer in charge of the work.

MR. DAWSON: Mr. Chairman, Ladies and Gentlemen,—I am not a dry farmer like Mr. Brown, nor a wet farmer like yourself, but as Alberta has recently gone dry, I am more interested in irrigation than ever. (Applause.)

It is to be regretted that the officers for the current year, or rather, that more of the officers for the current year have not been able to attend this convention, but it once more enables us to see how much devolves upon them. We are fortunate in having Senator Bostock with us and Dr. Tolmie to represent the President and the Vice-President as well as the province. I feel sure that you all regret that it has been impossible for Mr. J. S. Dennis to be present at this conference. He has always taken such an active part in the past meetings and his deliberations have always been of much value to us all. I only wish that I were more competent to make a few remarks for him. It was not until I was entering the hall this morning that I knew I would be asked to perform this pleasant duty. As a plain delegate to this convention, I would ask the privilege of expressing my appreciation to the representative of the Provincial Government, Dr. Tolmie, the Mayor of the city, and others for the kind expressions of appreciation on their part of the convention having met here at this time.

I have had fifteen years' experience on what are the largest irrigation projects in Canada, but I am willing to admit that the small projects such as you have in the immediate vicinity of Kamloops are quite often more interesting and worthy of fuller consideration than are the larger projects. These schemes though small should be considered as one of your greatest assets. When coming through on the line yesterday, I noticed at one or two points signs reading, "Irrigation not necessary." I rather construed this as being an admission on the part of the people interested in those lands that irrigation was not possible.

Might I be permitted to urge upon you all the adoption of the co-operative spirit, which is an absolutely sound principle for all business purposes as well as for educational purposes.

The benefits of irrigation show their results in better farms; improved living conditions; improved social conditions and a better citizenship. If conducted along proper lines it improves agriculture, saves the soil, inculcates industry, produces prosperity and should provide for posterity.

There is no doubt but that these conventions always result in a benefit to all concerned from the interchange of ideas and experiences of other successes or failures, and from the programme which has been placed in my hands, I have no doubt but that this convention should be quite as good, if not better than those which have preceded it.

I am looking forward with much pleasure to listening to the delegates and those gentlemen whose names I see on the programme. (Applause.)

CHAIRMAN: I will now call upon Mr. James Dougall, Agricultural Agent of the Canadian Pacific Railway, to address us for a few minutes.

MR. DOUGALL: Mr. Chairman, Ladies and Gentlemen,—I had no idea when I dropped in here that Mr. Rankin was going to ask me to address this meeting because this does not happen to be my particular line of work. Many people ask me from time to time, "What do you do for the Canadian Pacific Railway?" I will tell you. My particular work is to act between the producer and the railway company. I am supposed to see that the producer gets service from the railway. If he does not do so I am to report it to the Vice-President. I also assist the producer in finding markets and do anything I can to help him to produce and distribute the stuff he does produce.

I have attended this year, I think, twenty-two conventions of farmers and stock growers and other agricultural meetings. I have just come here from a meeting of the British Columbia Fruit Growers' Association held at Penticton, and I was on my way to the Coast when I stopped off here. I was very much surprised yesterday while on an auto trip to the top of the hills to find so much wheat being grown. A gentleman passed the remark that you had shipped 200 cars of wheat from this point last year, and I did not know it. To be frank, I should have known it. I have been investigating since I heard that remark and I find that in 1914-1915 you shipped 1,700 bushels of wheat from here and for 1916 you have shipped 6,176,000 pounds, or 100,000 bushels. That is going some, but I presume that is due to a great extent to the remark made by a gentleman here a few minutes ago, that the good Lord has sent plenty of rain. However, I notice the crops here and they do look very good.

As regards the prairie crop. We started out to estimate it at 250 million bushels. Now we are estimating it at 375 millions. I think that is the last estimate of the crop and all coming out in fairly good shape so that it would appear that an era of prosperity had arrived. That remark about bushels is for wheat alone, and does not include other grains.

There are one or two little things that have caught my attention strongly in the course of my work. Last winter my attention was called to eggs being shipped from Vancouver to Toronto and the egg shipments from Toronto to Vancouver with the result that the cars were crossing on their respective journeys. I was asked why this was and I could not believe it was on account of the hens. It may have been advertising I thought, but it was not necessary. It seems to be wrong, those sort of shipments, although there is money in it for the railway. We do not want that kind of profit, however. There is something wrong with distribution along that line and we should see if we cannot straighten it out.

I do not think it necessary for me to take up any more of your time. I want this to be brought to your mind. My department is for the purpose of investigation. If you have anything you wish brought to the attention of our Vice-President I shall be glad at any time to call upon you and hear from you. I can assure you that the Canadian Pacific Railway is here to do the best it can for you all. (Applause.)

CHAIRMAN: The next address was to have been given by Mr. E. F. Drake, Superintendent of Irrigation, Ottawa, but as Mr. Drake has not been able to be present with us, Mr. F. H. Peters, of the Irrigation Branch, Calgary, will address us in place of Mr. Drake.

MR. PETERS: Mr. Chairman, Ladies and Gentlemen,—I am very sorry indeed that when standing up before you at this time, I am not proving an exception to the rule this morning. I am speaking for somebody else who has not been able to get here. It was expected that Mr. Drake, of Ottawa, would be here and we expected to have an address from him. I do not think that I can make an address at this time and as Mr. Drake is not here I would just like to say one or two words as representing the Dominion Government, Irrigation Branch, of the Interior Department.

As you all know, the Minister of the Interior is Honorary President of this association, and I am sure if he were able he would like very much to be here himself. I know also that if the Minister, who is the Minister who represents the Dominion Government in these things, had known I was going to say something here he would have desired me to express on his behalf the hope that this will be a most successful convention and to say that as the Dominion Government and his department in the past has always been most interested in the work of this association, so that interest will continue in the future and I am sure also in so far as it may be possible the Dominion Government will continue to give the same financial support and other practical support to this association that they have done in the past.

Now, we have a lot of other speakers here and I am not a speaker myself, so I am not going to take up any more of your time on this occasion. (Applause.)

CHAIRMAN: I will now call upon Mr. R. G. Williamson to address us in the place of Mr. Hargraves, President of the Cypress Hills Water Users' Association.

MR. WILLIAMSON: Mr. Chairman, Ladies and Gentlemen,—I see I am here in the same position as the others. I am here supposed to represent two or three other gentlemen. I am rather sorry now that I am not a citizen of British Columbia from the way I have been used while in your province. Unfortunately, forty years ago, I wrote to a cousin of mine in Vancouver and I asked him how things were out there. I was then in Winnipeg. He wrote back telling me to stay where I was as it would cost a lot of money to get out there. I took his advice and that is the reason I am not a citizen of British Columbia.

We have good crops in our section of the country this year. One of our best irrigators donated 400 bushels of wheat to the Patriotic Fund last year. He is just a worker like the rest of us. There are some three hundred small irrigation schemes there. We have not been recognized very much even by our Provincial Government,

but we hope to be because we are getting on our feet and will now make them sit up and take notice as to our progress.

We held a meeting of our Association this year which was fairly successful and from the welcome we have here we wish you to be down there next year with this convention. We have not the beautiful scenery you have here, but we have the wheatfields and one will have to off-set the other.

We came through the Arrow lakes and immediately the idea struck me that if we had the water that is running to waste down there, we would certainly appreciate it. They do not seem to have distributed the water evenly in Western Canada. I am sure that with Mr. Peters as head of the Irrigation Branch we will soon have him and his engineers providing the water for us from these lakes. (Laughter.)

There are three things that you have that we need very badly. We need your lumber. We need your fish. We need your fruit. These things are almost prohibitive when we get them on the prairie. There is something wrong with the price also. There is too much for the middleman and if we could get that done away with, we would be much ahead of it.

I came up from Maple Creek and the citizens who came up from there with me are considered A1 in their home town. I did not realize the hospitality of this city until your Mayor told us we would have the freedom of the city if we wore the badge of this convention. I realize it more fully because another gentleman and I share the same room together. We have separate beds. It was in the "wee sma' hours" when he turned up this morning. If his wife had been here he would have been able to have his breakfast before he got up. Fortunately for me, I am always in bed and asleep at those hours and so I may not have to use the badge very often while here.

As there are a good many well known speakers here, some of whom I have heard before, and who I know will be of interest, I will not take up more of your time, but will say that I hope you will all be with us next year in Maple Creek. (Applause.)

CHAIRMAN: That brings our programme to an end this morning. We have some routine proceedings to take up. But, first of all, our Secretary has something to say to you.

MR. LAWRENCE: Mr. Chairman, Ladies and Gentlemen,—We have had some correspondence with His Royal Highness, the Duke of Connaught, who has expressed his regret at not being able to be present. His train does not arrive here until half-past eight on Friday morning. It was impossible, therefore, for His Royal Highness to be with us. As he was not able to be present at the convention here, we decided that the convention should go to His Royal Highness. The next Session therefore, after Thursday night, will be on Friday morning at the Kamloops railway station. The President will call the convention to order. At half-past eight the Duke of Connaught will arrive and will be asked to become the Patron of the Western Canada Irrigation Association and to accept the badge of that association, which we have prepared for him. He will then address the wounded soldiers and he has expressed his wish that they be brought to the station that he may express his pleasure at seeing them. Therefore, we wish as many as possible who can possibly

stay until Friday morning should give His Royal Highness a good send-off. He has won his way to all hearts in Canada. He is going with the splendid reputation of his august mother who would go anywhere to visit a wounded soldier. She would visit soldiers whenever there was an arrival. His Royal Highness has kept up this example and it is a matter of some pleasure and congratulation to ourselves that he is going to do that here on his way back out of the country to England. I hope, therefore, that all those who can possibly make it convenient to stay over will do so and convene at the railway station Friday morning. I will now read our lettergram sent to Col. Stanton, Military Secretary, H.R.H. Duke of Connaught, Victoria.

> "Will His Royal Highness permit us to ask him to become Patron of Western Canada Irrigation Association? This memento of his visit would be greatly appreciated by all members of the association of whom Hon. Dr. Roche, Minister of Interior, is Hon. President; Hon. W. Ross, President; Mr. J. S. Dennis; Hon. Duncan Marshall; Hon Senator Bostock, Vice-Presidents. Programme respectfully submitted. Last session of convention will be held at railway station, morning of 28th inst. Wounded soldiers in centre. Senator Bostock will present request and convention will sing National Anthem as Vice-Regal train departs."

to which we received the following telegram in reply:

> "Your telegram 25th. His Royal Highness will be very pleased to become patron of Western Canada Irrigation Association, and will be pleased to meet deputation of association at Kamloops station on Friday morning, July 28. Please, however, remember that His Royal Highness' stay at Kamloops is only ten or twelve minutes."—"STANTON." (Applause.)

CHAIRMAN: We now have to appoint a Committee on Resolutions and under the constitution of the association, it is left to the Chairman to name the committee. I, therefore, have much pleasure in naming the following gentlemen as members of that Committee: Dr. Rutherford, Chairman; Messrs. F. H. Peters, J. L. Brown, Wollaston, James Johnstone. I would also announce that the Committee on Credentials will be composed of the following gentlemen: Mr. W. H. Fairfield, Chairman; Messrs. A. S. Dawson and C. E. Lawrence.

I am also requested to announce a meeting of the Executive Committee in this hall before the afternoon session. The members of that committee are: Hon. Senator Bostock, Chairman; Messrs. F. H. Peters, J. L. Brown, James Johnstone, R. A. Travis and the permanent Secretary, Mr. Rankin.

Arrangements have been made to take a group photograph of all those attending this session of the convention. This will be taken immediately at the close of the session at a convenient point.

We are going to have a very interesting afternoon session and I believe all the speakers are here now. We will, therefore, adjourn, until 2 o'clock this afternoon.

TUESDAY AFTERNOON SESSION, JULY 25, 1916

CHAIRMAN: We will now commence our afternoon session. I will call upon Dr. F. F. Wesbrook, President of the university of British Columbia. The doctor is so well known to the people of British Columbia that he needs no further introductory remarks from me. (Applause.)

DR. WESBROOK: Mr. Chairman, Ladies and Gentlemen,—I feel that a great responsibility is mine. Firstly, that I should be asked to speak at this convention at all; secondly, that I should be requested to speak upon agricultural education before you, who are all experts in this basic industry of the world; thirdly, that I should be permitted to take Mr. Motherwell's position on the programme.

I have been looking forward for a long time to visiting Kamloops. I have seen it usually as I was passing through on the train with engagement at the other end of my journey. This led to depression and disappointment that my long-promised pleasure was again deferred. But I am now rewarded in being able to see something of your wonderful country at first hand. We know the splendid things you have been doing and are now to see them. We have heard of your stock and of your crops, and we may now see what transformations have been wrought through irrigation so that the seeming wastes are changed as by wizardry into veritable Edens. We realize that yours is not only a good country for animals, but also for man. It is good alike for the strong and for the weak. You have an institution here in which we all take pride. In it those citizens of the province who have been retired from the ordinary business of life by sickness are restored again to strength. I refer to the King Edward Sanatorium, which, I understand, we are to visit to-morrow. Your life-giving climate energizes the well and vitalizes the ill. It conserves and restores.

Amongst you who are attending this convention are people who are known far and wide as experts both in the teaching and practice of agriculture. I can therefore not venture further than to hazard a few observations and principles as one who sees your work from the outside. This may be productive of perspective or it may not. I think, however, that my agricultural education is progressing. I have learned something during the last week by my trip to Penticton and to the Provincial Fruit Growers' Association and am looking forward to adding to my store of information at your hands.

Even in matters educational, one must speak with conservatism and modesty, because although our educational methods and institutions have advanced we are yet in swaddling clothes. Civilization has advanced, too, and education, which should lead, too often lags. We are in reality just beginning to set out seriously upon our way, to bring teaching abreast of practice and to reconcile basic education with daily life.

To-day we will not lack for speakers who are experts both in agriculture and in education. We have on the programme Dean Howes, of our sister university in Alberta. We have also Dean Klinck, of our own provincial university, who, though he is to speak on another subject, will, I hope, give us some observations on education as applied to agriculture. Mr. Gibson, too, of our Department of Education, is here. He has already been able to appeal very strongly in this province on

behalf of and to arouse interest in the perfection of a system for effectively teaching our boys and girls to take advantage of the opportunities to be had in agriculture here and now. There are also representatives from our own Agricultural Department and from our sister provinces. From me you might perhaps gain less in facts than in fun, but they will safeguard you from the mistakes which I might make in dealing with agriculture.

Since I have not had the privilege of speaking before to many present in this gathering, I presume that a few words in regard to the university of British Columbia's beginnings might be of interest. Ours is, I believe, the infant university in America. I recently had the distinction of marching at the tail end of the procession in Seattle on the occasion of the inauguration of the new President of the university of Washington. The representatives of the visiting universities entered the assembly hall in the order of the founding of their respective institutions. I occupied a proud position in the extreme rear, and have not forgotten it. I still feel the most proper and becoming humility. However, what we lack in past achievement and present prestige are compensated for by the future which lies before us.

Our institution, of which you expected much and of which you still expect much, was about to commence its work when the war broke upon the world. We had announced that the tenders for the first of the permanent buildings would be opened on August 10th, 1914. Our country had been at war six days. Our Board postponed action, to meet again in a few days. At the second meeting we returned the tenders unopened because of the world-wide instability of financial conditions, for which there was no precedent.

We had expected also to spend $50,000 on library purchases so as to have an equipment of books on hand before the arrival of the staff. Suddenly the rate of exchange went up to $6.75 per pound sterling. We cabled to stop buying books when the commission was half executed, the work in Britain and France having been concluded. At that time the purchaser whom we had borrowed from another university, was prisoner in an enemy country and never received our instructions. He was afterwards released. We have received the books he purchased and now have, with these and other purchases and gifts, approximately 30,000 bound volumes in our library and about 10,000 pamphlets.

We felt at the beginning of the war that the immediate future was too uncertain to continue library purchases in Europe, although the ultimate outcome has never been in doubt.

In order to continue our building programme, we advertised for tenders for the steel concrete structure of the building, hoping if the war should prove abortive, that we might complete it at an early date and thus avoid delay. This contract was let, although this building on the permanent site must remain at that stage for some little time yet.

In regard to our plans for grounds and buildings, we had secured the best advice to be obtained in this country, Great Britain and the United States. The late Dr. C. C. James was good enough to come out and meet with our landscape, engineering and architectural commission. He advised us in regard to our agricultural development.

Owing to the conditions which the whole world was facing, there were many people who were rather inclined to doubt the wisdom of going forward with the university. However, it seemed to us all that if ever a mechanism was needed to take its part in training our youth to meet the conditions involved in the destruction of war and later reconstruction, now was the time. Work was therefore begun. Explanations were not needed. Neither were apologies—nor are they now, and I shall not bore you further with the "might-have-beens."

The university was opened on the day announced. We had to content ourselves with temporary quarters. Despite the war, 379 students registered during the first year. There are at present about 150 of our men at the front. Fifty-six students of McGill University College who had planned to come to us had enlisted before we opened our doors. When you think that we had only 228 men registered in our first year, the remaining 151 students being women, you will see that the university is fairly well represented by nearly 100 who have gone since. Conceived in times of the world's greatest prosperity and born in the crisis of world war, we shall not be lacking in traditions. The fact that your university in its earliest days has been permitted "to do its bit" for the Empire and for the maintenance of the world's ideals and standards cannot but serve as an inspiration in later years. Our boys, with students, graduates and men of university type from our sister provinces, constitute the Western Universities Battalion, each of the four western provinces furnishing a company. That battalion is not the worst battalion of the twenty-seven now assembled at Camp Hughes; in fact, I am told that it is the best. It is, in any event, the first university battalion to be organized in Canada. A great proportion of the men already have received their officer's certificates, and it would not be surprising if the battalion is called upon to furnish men as officers to other Canadian and British troops.

Military drill is compulsory in our university because we believe that when free training is given at the expense of the state for life's work, that the individual thereby obligates himself to make some return. Furthermore, we believe that the care and training of the body are just as important as of the mind.

In regard to the work provided. Under the conditions of temporary organization and housing, we had to leave a number of fields uncovered. At the time war was declared, a number of the very best men had been induced to sever their relations with other institutions and organizations and had been brought to the province. The first appointment made was that of Dean L. S. Klinck, of our Faculty of Agriculture. Many of you know Professor Klinck, or knew him of before we were fortunate enough to enlist him for service in our province. Dean R. W. Brock, formerly Director of the Canadian Geological Survey and Deputy Minister of Mines, was appointed to the headship of the Faculty of Applied Science. Other men of similar type and calibre were appointed and had reported for duty, or were on the way. The members of the staff of that splendid institution, McGill University College, which went out of existence when the university undertook its work, were already here. We were bound to continue and extend the work to which the province was already committed through the activities of McGill University College. This work was largely of a more classical and standard college type and did not provide for the immediate application of expert knowledge to the practical affairs of life. The experts in the practical sciences, who had already reported for

duty, consisted of heads of departments, each of whom was expected to organize his own department and make further recommendations for staff, had it not been for the war. As you will see, a certain number of the units of the larger institution which had expected to begin its operations in 1914, had been assembled, which, with the staff already on the ground, who had been covering such basic subjects as mathematics, languages and similar work, had to be welded into a temporary organization. This of necessity left a number of fields uncovered and threw upon certain of the men work which we had expected would be taken by others who were not yet appointed.

I am sure that you will approve of the original plan, which was to bring the best obtainable experts to the province in ample time so that they might look over conditions and have time to plan the work and equipment and each to organize his respective staff or faculty.

You will be more interested, perhaps, to know what has been possible in the way of agriculture in spite of the changes in plans. You will perhaps also recall that in the great institutions where agricultural training is provided, the initial and current expense is enormous. The universities of Minnesota, Illinois and Wisconsin each spend annually upwards of $600,000. This is true also of the State College of Agriculture at Lansing, Michigan. The buildings for the Manitoba Agricultural College have cost $3,500,000. Dean Klinck has been single-handed. He reported for duty in the province over a year before the university opened its doors and has spent his time in a thorough investigation of conditions throughout the province. During this time he has become personally known to many of you and has given lectures and addresses before gatherings of every kind. He has co-operated with our provincial departments of education and agriculture. He has been appealed to for expert information in many directions, and has been in most parts of our vast province. He has been judging exhibits for you. You must not think, however, that these have been the limits of his activities. Already he has been able to bring over ninety acres of the university site at Point Grey under cultivation. Last year he instituted experiments to determine the best treatment of soils and the most suitable crops for that land. Certain breeding experiments were conducted. He had a series of experimental plots which yielded to him the basis of procedure in the development of his present ninety-acre plot and the other land which is to be brought into a state of fertility. Exact record has been kept and the commercial, as well as the scientific viewpoint, has been always considered.

It has been the plan of the university to organize the agricultural college, providing the necessary land, buildings and equipment, so that from the very beginning provision would be available for the training of experts through a four-years' course. We wished in our own work of training experts to provide men of sound judgment and broad horizon, who would be most helpful in our province, where agricultural conditions are so complex as almost to be bewildering. In this way we hoped to avoid the making of costly mistakes and the discouragement which is all too frequently encountered. I am sure we all believe in providing the expert for the avoidance of mistakes rather than to wait for him to cure them.

For many years I was active in public health work. It was a continual source of amazement to me to see communities proceed to the expenditure of thousands of dollars in the installation of water works and sewage disposal plants on the

basis of the opinion of the town council or some local authority, whose enthusiasm was in inverse proportion to his training and soundness of judgment. When disaster came the expert was called in. He could not save the lives which had been lost and usually found it necessary to expend in cure many times the cost of what would have prevented.

We, in British Columbia, have need, which is greater than that of many of the other provinces, for experts in the beginning of our agricultural development, and we therefore planned to provide for the education of these agricultural experts in the beginning, intending to extend the work as rapidly as possible so as to provide short courses at the university and extension work throughout the province, which would bring our own experts into touch with local conditions. In this way expert knowledge would ultimately permeate the whole province, not only through the experts trained and sent out from the institution, but through personal contact of the university staff with the workers in agriculture.

We heard this morning that agriculture in British Columbia was improving, but that it required brain and some capital in order to make it a success. We believe that we have a very superior class of population and that we have a much smaller percentage of illiteracy than in other provinces. Our education department is one of which we can well be proud, and we are not sorry that in many of our communities our one best building is the school. We rejoice that our teachers are better paid than in other provinces and look forward to the time when we shall realize that the pay should be such as to encourage the very best men and women to go into the profession as a permanent life's work.

We realize that in Alberta, where conditions are different, a splendid solution of the present agricultural problem has been found in the agricultural school. One cannot help wondering, however, how the public schools, the agricultural schools, the University College of Agriculture and the experiment stations are ultimately to be related so as to do the best team work. Doubtless our sister province will effect a sound and efficient co-operation. In the meantime, the problem of providing immediate agricultural instruction is being met.

In British Columbia, through Mr. Gibson's work, opportunities for basic training and the inculcation of agricultural principles is being provided in the high schools, which will be brought into proper relation with the university, whose main function was deemed to be the training of experts, the prosecution of research and investigation and ultimately to constitute itself the expert investigational arm of the province, with the added work of providing short course instruction at Vancouver and at various points throughout the province for those who are unable to attend the full course designed for experts at the university. In addition to this the carrying by the university extension movement of agricultural instruction directly to the man engaged upon the land, in such a way as to articulate with and extend the primary teaching given by the Department of Education in the schools, is planned. The advent of the war disarranged this plan, and in order that the university might be doing something to foster an interest in and extend our knowledge of agriculture as widely as possible, a course was arranged by Dean Klinck which was called "The Scientific Basis of Agriculture." This was open to all university students and about forty elected it. Dean Klinck could very much better describe it than I, and I hope that he will do so. He furnished a background

Concrete Lined Irrigation Ditch

of the history of agriculture and a foundation of the physical and biological sciences. It did not end there, however. It went into the social as well as the economic side of agriculture because he felt that we are not going to solve rural problems on a sheer basis of increased acreage or of bushels per acre. We must make rural life worth while. In comparing the rural life of Manitoba in 1878 when I knew it as a boy, and the Manitoba of to-day, we see that rural life then was existence, not a life. We often wonder why people go to the cities. Why should we wonder when we consider rural conditions? Dean Klinck gave instruction in his course on the administration of the farm and scientific management. He took into consideration organization, gave some account of the different developments in various countries involving governmental assistance. It was a practical course given by a practical man which did not ignore the human element. The late Dr. C. C. James was very much interested in it and tried to induce Dean Klinck to publish the lectures in the form of a book.

The course was very popular and students are given credit for it towards the degree in arts. It seemed important that students who had been born and brought up in cities should get some real conception of rural life, since they should not be deprived through ignorance of the possibilities of a vocation, for which they may be naturally fitted. Students who intended to become teachers and whose work would bring them into the country, were enabled by this course to take an intelligent interest in the problems which will surround them, to be of intelligent help to their students and to have a sympathetic understanding of the problems of their parents. Certain students who were looking forward to the ministry took the course. This brought them into closer touch with the life and work of their future people, should they be called to rural communities. Future lawyers, doctors, business men, and, we suspect, legislators, have taken this course, and we plan to continue and extend it so that students in arts and science will have opportunities of still further courses in agriculture, in forestry and in other subjects which bring them close to the land.

In the meantime we are going forward with the work of organization and development of our agricultural college and have proposed a plan of co-operation with the Dominion Government which will enable us to give short courses of instruction in agriculture to returned soldiers who may wish to go upon the land. This should enable the staff to determine whether such men have the necessary aptitude, lacking which they should be discouraged from going on the land. It will enable others to choose land more intelligently, to determine beforehand the lines in which success may be reasonably expected. We hope that we may be permitted to do this work so that the university may be doubly patriotic, not only in sending her students forward to participate in the war, but in helping to welcome those who have given their services to the country on their return to civil life and do everything that is possible to ensure their happiness and success.

A point which I wish to develop to-day is that the day of the pioneer is pretty well over. To-day we are equipped with everything that the twentieth century has produced. It lies to hand ready for use. Pioneering in Manitoba in 1878 with the present rail and steamship communications, with electric power and light, telephones, automobiles and areoplanes would have been a very different thing. We are apt to be very proud of our achievements in this direction. How have

these things come to us? We obtained them through concentration of one individual on a particular line of work, so that he became more and more expert at it. This has come to be the day of the expert and the man who knows a great deal about everything and not much about anything is regarded as a misfit. As a sign of our evolution, take for instance the naturalist. He is pretty well extinct to-day. In his stead we have many men, including the expert with the microscope who is an authority on the flagella of bacteria and can tell us everything there is to know about their method of locomotion. In his stead we have the botanist, or rather many botanists, each one of whom is an authority on a certain phase of his work. We have those who are expert on the different kinds of plants, those who are expert on the animal, bacterial and vegetable parasites and foes of these plants. We have experts on animal husbandry and breeding. As you consider this matter, you will see that now we have hundreds of men who cover in detail the knowledge at one time possessed in gross by the so-called naturalist. See how the work of the carpenter has been subdivided and how machinery has been introduced. These things came upon us so gradually that we have not realized it. We are impatient because man has less versatility by this development of specialization, but we cannot turn backwards, and to long for the good old days when everybody could do everything, is useless. This specialization is a definite and inevitable affair. It is an evolution for which we must prepare in advance. Our educational systems find it very difficult to furnish the proper proportions of cultural and technical training. Those of us who are specialists in different scientific branches are fully aware that useful knowledge may be cultural and that scientific subjects are not the less scientific if they can be applied to the ordinary problems of life.

Perhaps we attach too much importance to the exact subject matter which is taught in our schools. We should realize that the personality, character and outlook of the teacher are more important than the subject taught. We do not give our teachers and our university professors the support which is necessary. We hold them responsible not only for the training of our children's eyes, hands and mind, but for the inculcation of manners and morals. Our educational institutions are, by law, non-religious and yet we neglect in our own homes to an increasing degree the religious teaching and practice of our fathers. We take great pride in our schools when we seek to save our children the bitterness and disappointments of our own struggles and experiences which resulted through lack of knowledge. Yet too often we are more concerned about the physical equipment of our schools than by their human equipment. We may rightly regard the training of our children as the most important of our public functions and yet too often we leave it in the hands of inexperienced men and women, nay, of boys and girls, to whom it is but a temporary vocation, a stepping stone to what is wrongfully regarded as a higher profession, say law, medicine, mining, engineering, or the church. This is not the fault of our most excellent educational system but of public opinion which does not really regard school teaching as being the most worth while of all the callings. If it did, pay would be more on a par with responsibility and we should not be satisfied with anything short of the best equipment of natural aptitude and long training.

There is now little encouragement for men and women to look upon teaching as a permanent work. Schools lose their very best teachers to the professions.

Universities and technical schools are bereft of their best by commerce and private practice, which pay better and apparently command greater respect. All these things which are true of our formal educational mechanism are true also of the other co-ordinational branches which are necessary to prevent chaos, as we go on each becoming more expert in his own line and drifting further from his brother experts.

The chief co-ordinational branch, of course, is governmental, and the same conditions are found in regard to it. Just call to mind the meagre salaries paid to legal, public health, forestry, fishery and mining experts in the government service. How many of them are attracted away into commercial, industrial and corporational fields. It is not unusual to see a governmental expert, at a salary of a few thousands a year, opposed in a legal contest to corporation experts whose incomes are many times greater than his. Is the public properly protecting itself? You have men in this meeting who are worth many times what they receive in government service. Some of them have stayed in government service when offered much larger incomes to engage in private or corporation work. We have come to the days of the expert and the public should have and pay for the best that is to be had in order to protect the public from the predatory few.

Our agricultural training institutions will have, as one of their big functions, the production of men who shall be charged with the responsibility of looking after the interests of all. An increasing number of men and women will be required to keep the various groups of specialists related to each other and with their faces turned in the right direction. We need men who have been trained and become expert in one thing and who also have broad sympathies and great faith and vision. It will be their business to teach, to plan, to organize and to administer for individuals and groups who continue to be absorbed in their own special problems and who ignore their public obligations and opportunities. If democracy is to succeed, such men and women must be trained, used and paid. They must merit and receive confidence, and we, as citizens, must show more practical belief in our democracy than we have done in the past. We must exercise judgment in our public decisions and having taken pains, give time a chance to vindicate that belief.

We cannot escape personal responsibility by blaming any particular government or official for certain conditions. If our government is representative in fact as in name, then it is we, the people, not our mechanism and our servants, who should be blamed. It is time we adopted a universal standard of ethics and no longer maintain one for personal, one for business, one for professional and one for political purposes. As never before, we are faced with the necessity of preparing for our share of an imperial plan.

Whilst stressing the importance of the careful selection of teachers, we should not leave out of consideration that students perhaps derive more from each other than they do from their teachers. Whether what is acquired by one student from another is for good or ill is important. If we could develop a proper dormitory system we should be able to have living in the same house and meeting on the same staircase, men who are being trained in agriculture, others who have selected law as their life work, others who are to be doctors, another who has his eye on the ministry, another who is going in for a business career, and yet others who are going into the teaching profession. They should be encouraged in every possible

way to get each other's viewpoints in early life, to know each other's aims, to respect each other's standards. By these and other such plans we may hope in Western Canada to avoid what is probably our greatest danger, that is, sectionalism. We find it now almost impossible to keep in touch with each other. Not to keep in touch is to grow suspicious and to grow suspicious of those who are specializing in other lines and on whom we are becoming daily more dependent is to court disaster. As we see and know more of each other we realize that we are swayed by a mixture of good and bad motives and that the good motives outweigh the bad ones.

If in the time to come our young men and women, whose lives will diverge more every day after they leave college, have come to some common understanding in their youth, the different classes and groups which constitute our democracy will be less suspicious of each other and more sympathetic and helpful. In the days to come, when our legislatures are filled with men thus prepared, is it too much to expect that we shall be able to catch up in our co-ordinational mechanisms, with our tendencies towards specialization, which have outstripped them? How are we to proceed intelligently on our ways towards training the men and women who are to take up our work when we lay it down and of whom we hope and expect a development far in excess of our own?

It is to be assumed, then, that in technical courses technical subjects will be covered. Engineers will receive preparation for the undertaking of responsibilities which may place the lives, the safety, the property and perhaps the happiness of thousands in their hands. It is to be expected that they will have been offered every facility for acquiring first, accuracy, and next, speed. Above all, it is to be assumed that they are of sturdy character and will keep faith with themselves and with others. Yet no matter how skilled, how broad in vision or how faithful, they are handicapped if they are ignorant of the work and aspirations of others who have gone before them, of their successes and of their failures. They must know the work of their contemporaries. They will always lack opportunity to serve their fellows fully if they are unable by spoken or written word to convey their ideas to others. The greatest engineers of this and other countries would still be obscure had they been unable to spell correctly, to speak intelligently and forcefully, or to write a convincing and interesting report, or an accurate set of specifications for a board of directors, a city council, a federal or state government, or other bodies. How would the engineers of this country avail themselves of the knowledge and experience of kindred workers in Europe and elsewhere if some had not possessed fluency in modern languages? How lonely is the civil engineer or the superintendent of a mine isolated from others of similar tastes if he has not acquired or if he cannot acquire a taste for literature, or who has no intellectual pleasures. How impossible will it be to co-ordinate the specialists and technicians who are so absolutely wrapped in their own work that they have no common interests or tastes to share with others with whom they should co-operate. These considerations are equally applicable to the agricultural experts, many of whom for long weeks or months may be dependent upon themselves for company. Has not this isolation tended towards suspicion and sectionalism which set individual against individual and group against group? We surely cannot expect to solve our rural problems, to counteract rural depletion, to stimulate a current of desirables back from the city to the land

on the sole basis of improved agricultural technique or from economic considerations alone. Social reconstruction is just as necessary in rural as in urban districts. Not every son of every farmer will find his fit place in life on the farm. Nor does it follow because a boy is born in the city that his happiness and success will be found as a city dweller. Currents must be set up in both directions and the social considerations are just as important as the economic considerations. Those of us who are interested in medicine, realize the difficulties of getting skilled and satisfactory medical service in the rural districts. The cure of this ill is not to reduce the standards in medical education so that more doctors are graduated each year, because we now have twice as many physicians as we can properly support. The great difficulty in this profession, as in other walks of life, is that the cities are over-crowded and that the country districts do not pay at present. By this I mean they do not afford a living income, a chance to bring up and educate a family and an opportunity for the individual himself to grow. The city affords greater opportunity of advancement for physicians who are naturally, and by training, best equipped. At the same time, and unfortunately so, it affords refuge for the weaklings who have greater facilities for hiding their mistakes and who can find counsel and help amongst their fellow physicians more easily in the city than in the country. Matters of public health and personal hygiene are perhaps more often ignored in rural districts. Recreation and the ordinary comforts of life are not so available there for those who are tired of dreary routine.

On such an occasion, I would not venture into details with which you are so much more familiar than I, but I could not refrain from mentioning the importance of keeping clearly in mind the social as well as the economic and technical problems which have to be considered in this world of ours which has become so complex.

There is no profession, to my mind, which is so exacting, which demands such versatility, hard work and wide knowledge as that of the profession of agriculture. It is, nevertheless, perhaps the most attractive field for a man or a woman of ambition. A knowledge of biological and physical laws is imperative. A sound grounding in the principles of experimentation with proper control of the variants must be had. Industry is the *sine qua non*. A business training is necessary and in addition a knowledge of human nature is essential, since co-operation in agriculture is the watchword, if for no other reason than in the matter of marketing. In addition, if we are to play the game, we must keep in mind the ideal of passing on the land to our children and children's children, in a better and not in a worse condition than that in which we found it. We certainly cannot sympathize with the man who said: "Damn posterity! What has posterity done for us?"

The pioneering days of the world are drawing to a close. The time has come to plan definitely for utilizing our lands in perpetuity. It is no longer easy, after having exhausted one piece of land, to sell out and move on. From now on we may expect to see different localities in this country, as in Europe, developing each its own type of cereals, fruits and other crops and in addition definite and wholly desirable strains of live stock, which shall be known throughout the world as produced by and peculiar to those localities. We shall look forward to our analogues of Clydesdales, Percherons, Shropshires, Holsteins, Jerseys, Berkshires, and other strains. This is an ambition yet to be achieved. It is only possible when, year after year, generation after generation, and century after century, the knowledge

acquired by the father is passed on to the son and the desired goal is reached, not alone through careful selection of the animals, but through careful selection, training and encouragement of the men who seek thus to glorify their calling.

The pioneer liked "elbow room," but elbow room will soon be hard to find. Individualism grew rampant. As we have seen, the pioneer's problems were his physical and biological, and not his human, environment. We shall hope for the perpetuation of individuality and for the growth of personal freedom. Such personal liberty for which every one should be ready to fight is the individual's right to serve, and not his right to impose his will ruthlessly upon another. We are back face to face with one of the problems with which we began, the relation of the individual to the mass, but shall not dwell upon the subject further than to say that with the annihilation of time and space we can no longer think and plan in terms of individual, of community, of state or of nation, but in terms of world. This is the natural and inevitable evolution. Yet individuals must be related to each other within groups, group must be adjusted to group, community to community, and nation to nation.

We have also seen the inevitability of specialization and may expect to see it increase instead of decrease. We have seen that in spite of the progress which has come to us whereby we have subdued nature, that our social complexities have increased with our scientific and economic progress. We have seen our inability to solve man's problems in terms of things. We have seen that specialization brings greater mutual dependence and greater danger of individual and group isolation. Group co-operation and co-ordination have not kept pace with progress in the various special lines. The two safeguards upon which we must rely are our educational and governmental mechanisms. Of necessity, these must not lag behind practice since we must teach what we have proven to be true, and we cannot afford to crystallize into law things which are yet in the experimental stage. We can, however, improve both these most vital mechanisms. Since specialism is inevitable, why not accept it as such? Acceptance of this dictum means the continuation and extension of our public training of experts. It means the stimulation of research and investigation on a public basis in order to lay bare yet more of nature's secrets. It demands that we retain and cherish the old truths whilst seeking new ones.

We should pour contempt upon our pride when we realize that our main problems are still those of the time of Moses, of Socrates, of Caesar, of Cromwell. In fact, they are eternal, and yet we have the equipment and tools of the twentieth century with which to solve them. We, who are so filled with the pride of progress, should be mindful of the work of our fathers. We must not throw away lightly the things which they found worth while. We should revere those who have gone before, and cannot safely substitute skill of hand and eye for training of mind and spirit. We must remember that speed spells progress, only when we are headed in the right direction. We have been pioneering in our province with twentieth century tools and should be fully alive to the danger of so doing. We have achieved our almost complete conquest of things by specialization. Each of us believes in his own specialty. He demands that others believe in it, too. He asks faith in his own integrity, skill and expertness. Does he get it? No. He knows full well how dependent others are upon his *bona fides* and knowledge, but they do not.

He, too, is sceptical of his own dependence upon other experts and yet increasing specialization which means progress means increased dependence of each individual upon others, of each group upon other groups.

Our great task is the establishment of understanding, faith and sympathy between individuals and groups. We must frankly recognize the need of highly trained and efficient experts to ensure perfect team work in peace as in war.

Upon us will fall a peculiarly difficult and responsible work since it is necessary to weld the people whom we have garnered from the four corners of the earth into a nation. Undoubtedly after this war is over we must expect many additions to our numbers. We shall wish to Canadianize and imperialize the new comers. It is necessary to ask ourselves what we mean when we say Canadianize and imperialize. It calls for the definite establishment of definite ideals and standards acceptable to and possible for all. That we can rise to this huge task no one doubts. The eyes of the world are upon us. Such an opportunity has never come to any nation. This is our opportunity to become the cultural, the intellectual, the spiritual, the industrial and the commercial Mecca of the Empire. It demands, however, a plan which is all-embracing. Whether we develop the individual for the interest of the state or mould the state for the best interests of each and every citizen, may, perhaps, bring the same result in the end. It requires the preservation of the individual's right to serve his fellows and seems to demand at times the subordination of the individual for the benefit of the whole. The same self-sacrifice, devotion, enthusiasm and hard work which have wrought the miracle of modern scientific and industrial achievement, without realizing our neglect of social and spiritual considerations, may be relied upon to unravel the complexities which have arisen when they are fully apparent. These forces cannot but succeed. The Golden Rule must dominate. The gospel of hard work must be preached. Minds and hands require training. Unto us is given the privilege of taking part in the upbuilding of the greatest Empire in the history of the world. We may well adapt for our motto that of the Prince of Wales: "I serve."

Shall we accept it? Have we the needed vision and strength? The agony which the world is enduring will have been suffered in vain if we cannot learn how to develop and use the best that is in each of us for the advantage of all.

Is not the world at war to determine whether the greatest right of every man is that of serving others, or of being served? We are adjusting our perspective of obligation on the background of individual right. (Applause.)

CHAIRMAN: His Worship, the Mayor of Kamloops, desires to make an announcement to this convention.

MAYOR TYRRELL: Mr. Chairman, Ladies and Gentlemen,—I am sure that during the course of the discussions and papers at this convention you will hear much good about water, and that water properly applied on the land will produce better and greater crops. I wish to assure you, on behalf of the city of Kamloops, that the drinking water is perfectly safe and may be used with the greatest liberty. It is also quite fit to be used to reduce any concentrated beverage which any of the delegates may use. We are, however, going to show you at the close of this session another use for water, and this will be demonstrated by the fire department

Tiles for Irrigation Works

of this city. We have an automobile fire department with three paid members, and the balance are voluntary members and all will, I think, give a good account of themselves. (Applause.)

CHAIRMAN: Our next speaker on this afternoon's programme is Professor E. A. Howes, Dean of the Faculty of Agriculture, University of Alberta, who is, I think, well known to most of the delegates here. (Applause.)

PROF. HOWES: At the outset I wish to express my appreciation at being called upon to speak upon the subject of agricultural education. I know the day has gone by when one needs to make explanations as to why one should speak on agricultural education. I recognize that the day is now with us when people realize the importance of agricultural education to our boys and girls, realize it is more important than the mines and fields and the flocks and herds on a thousand hills. That time has gone by, yet I am constrained to express my appreciation of the fact that this association always couples with its utilitarian purposes the work of agricultural education.

It has been rumored that we in the West are given to a certain amount of boasting, and as my subject is agricultural education in Alberta, I want to put you right at the start. Pat at the Confessional once said to his priest: "Father, I have to confess I kissed Kitty McBride." "Well, well," said the father, "and how many times did you kiss her?" "Ah, father," said Pat, "I came here to confess, not to boast." So much, to give you an idea of my attitude in this matter. So that when I speak of agricultural education in Alberta I hope you will not think there is any particular boasting on my part. I had the opportunity of speaking upon the same subject at Bassano last year, and now I see a number who were there, so I will try to switch off from what I said there and take the question up from another angle. I will talk about the machinery for agricultural education which we have in Alberta, and then I will take up a question which has been forced upon me this winter. It is not just exactly what you expect me to take up, perhaps.

When I speak of agricultural education in Alberta I like to discuss or think of it as a result of a condition in a new province, call it pioneering or what you will. The fact is, that the new provinces have gone ahead in a short space of time where it has taken a longer time for the older provinces. That fact is, that the new provinces have taken the failures and successes of the older provinces to guide them in their work.

I would like to speak this afternoon in the following order: First, agriculture in the public schools; second, agriculture in the high schools; third, domestic science; and, lastly, I would like to speak of the Faculty of Agriculture.

AGRICULTURE IN THE PUBLIC SCHOOL

When I came to Alberta I found they had a good course of study drawn up. I have had the privilege of acting on the committee that re-organized that course. The teachers must have special training for teaching agriculture in schools, so we had our summer school in the university. The first summer we had 78, next year 155, last year we had 311, and this year 316. That in itself was not enough.

We had to have a text book, and that was gotten out by the Department of Education. As the author of that book is here this afternoon, I am not going to say much about it, only to convey this little tribute, and that is, that as far as English and illustration and dignity is befitting an agricultural education the book is in a class by itself.

AGRICULTURE IN THE HIGH SCHOOL

I want to say a word or two as to the importance of agricultural education in the high school. I wish to speak about this generally. Later on I may not think about it. I wonder how many ever stop to think of the benefits of an agricultural education in the high school on the general community. In Alberta the teachers go through the high school under town conditions, and when they are through their course, where do they go first? To teach in some school out amongst the gophers and to teach children whose profession is agriculture. It is ridiculous and worse than that to send teachers out without an agricultural education to teach those children. If we would only stop to think about the up-hill task before some of these teachers, we would not laugh at them so readily. This reminds me of the story of the two young men who came to Alberta and took up farms. Later on they married two young girls from the East, as many in Alberta have a habit of doing. Time went by. One of the farmers one spring went over to his neighbour to borrow a bushel and a half of wheat to finish seeding a piece of ground he had prepared. The man being away, his wife came to the door. When he made his request known, she said: "Come out to the granary, I can get it for you." She picked up a peck measure and put in one, two, three, four, five measures full and then said: "That is just about as good as John could do it." He said: "Is there not more coming to me, I would like a bushel and a half?" She then started to count again and said: "Why, yes, there is. You know, I was only a school teacher before John married me." (Laughter.) This was one of the teachers who was taught in the usual way. That is just to show the double importance of agricultural education in high schools in Alberta.

I would like to say a word or two about the special form of agricultural education. You understand, of course, I am referring to our schools of agriculture. It is a pleasure to me to be able to speak about them. They are past the experimental stage and need no tribute from me. All I need to say is that they have prospered beyond our expectations. We started with 268 students the first year, 317 the second year, 355 last year, despite adverse conditions. That is not all. I sometimes feel that in agricultural institutions we pay too much attention to the number of students we get. I want to pay also a tribute to the quality of work done in the schools. I was principal of one of the schools at Vermilion and I want to say in passing that I cannot say enough as to the satisfaction expressed by the people who were sending children to the schools. Some of you may not know the work we are doing. The major subjects we are giving include a course in animal husbandry, field husbandry, farm mechanics and domestic science. Then we are taking up the foundational sciences—botany, chemistry and so on—and also, of course, mathematics and English. The courses are given to meet the

requirements of the boys going back to make homes on farms. I am not going to boast, as I said before, so I will only say that the courses have fully justified their inauguration.

DOMESTIC SCIENCE

As to the domestic science side, I want to say a few words. It has been most gratifying to see the increase last year in the attendance of girls to the school—girls, not coming there to fit themselves to teach domestic science, but most of them coming as home-makers and a great deal will depend upon what will be done in the school in this direction. Domestic science will mean a great deal for the home conditions, and our farmers in Alberta must attach more importance to the kind of home conditions that they surround themselves with. Our Minister is apt to say something about the installing of home machinery. He has taken the farmers to task as I have done for spending money on machinery for outdoors and not spending a proportionate amount indoors. We must realize that this is going to bring about a change in the attitude of the people on farms. In an older country a man thought it was time to take to himself a wife, and he had been paying attention to two young ladies in the neighbourhood. He was not sure which one he wanted, but he was sure he could get either of them. One was robust and one was delicate. So he went to his father and said he wanted advice about the matter, and said: "I suppose you will tell me to take the one that will do the most work." His father said: "Well, I don't know. Times have changed now. They are getting so much machinery in the home. Perhaps it would be more economical to take the one that will eat the least." (Laughter.)

FACULTY OF AGRICULTURE, ALBERTA

Now, you won't blame me very much if I take up some time to discuss the work carried on in our Faculty of Agriculture, as that is the work I stand for.

At the University of Alberta we have established a Faculty of Agriculture. Two years' work is taken up in the school of agriculture, and then at the Faculty of Agriculture we give a course of three years on top of that. We are very young yet as far as the work is concerned. I do not care to say very much, but we could not have entered into the work if we did not have ideals ahead of us. We have established a college of agriculture and it is just as well that we should state for what we stand. In that work it is the ambition of myself and all concerned with it, to make the course as truly practical as we can make it, just as it is in the schools, and by the way, I had better explain the word "practical." It is this: We are making our work practical because we want to put back of it the right kind of theory. No man was ever truly practical unless he had the right theory at the back of his practice. I would like to tell my experience in that particular line. When I was at the Experimental Farm at Ottawa I was given a piece of ground for the purpose of an experimental plot for seed tests. We put in about 282 plots in field roots and we had to treat them all alike in the matter of cultivation and so on. The Director of the station gave me five men to help in the work. I don't know what nationality they were, but I do not think they were Irish-Canadians. I

wanted to show them that I wanted to thin out certain plants so far apart and wanted them to see that the earth was not pulled away too much. I went away and afterwards when I returned I found that the men were practical enough but had no theory. They had done what I wanted them to do because if there was not a plant in the proper place they would leave a pig weed. (Laughter.) There are a great many people who think that to be practical a thing must be of the saw-horse or wash-board type.

We are trying to give a thorough course in animal husbandry. I need not speak to any great length on this. It is bound to be the leading industry in Alberta. In a sense, all others must be contributary to it. It is highly necessary that our boys should get a thorough course in producing and breeding. In that connection I would like to say, also, that there is a course in veterinary science given there, also of a practical type. The packing houses are reserving the condemned carcases for our use and our boys go over there with their instructor and dissect those carcases and find out first-hand about diseases.

I have not much to say about field husbandry, but we are endeavouring to link up the college with the work the boys are doing at home. It has always seemed too bad that the most important work in field husbandry is carried on in the institution when the boys are away at home. We are trying to establish a department whereby we can link up the work at home with the work at the institution. I have in mind certain co-operative experiments, not that they will amount to very much in the field of research, but they will establish a fellow-feeling in our work.

There are two or three other little points. Our boys should have a course in pedagogy before they get through. Too many schools have been sending out boys who are not equipped in the science of teaching. The majority of them will never teach, but we are hoping that when they go home they will settle down and at least make better trustees than others I have met. I would like our boys to have a course in public speaking and composition and all that pertains to both. Did you ever stop to think that boys from an agricultural college are up against a hard proposition? I would like all the boys to have an opportunity of standing up and saying in intelligible English just what they have to say on an agricultural subject and then sit down. I never had that training myself. (Laughter.)

I don't know that I need take up much more of your time in telling you of the machinery which we have. I have run it over in a general way.

There is one more point—the question of agricultural education, particularly higher agricultural education. We have met with a peculiar condition in this regard. There are thirteen boys taking the course. About ten of those boys have farms and have announced their intention of going back to the farm.

The last time that Dr. James was in the West that I know of, he and I sat down on a railway truck in the Canadian Pacific Railway station and talked together. He said to me: "The time has come when agricultural institutions should have backbone enough to get out and say 'we want higher education for our farmers' boys if they have the time and means to secure it, just as much as in any other profession,' and this time is up to you." It set me to thinking. We have boys going back on to the farm and we must meet their needs. In looking after their needs we are not neglecting the needs of those who have no farm to return to. I just mention this in passing because there seems a little misapprehension

throughout the country as to the function of the agricultural college. We have made it so that the boy can go on taking one year, two years or three years.

I want to emphasize one point. I won't say it is true of Alberta or British Columbia. It is true, however, of some other places. Let a boy go through a school of medicine and make a failure and the people do not come out and say: "Oh, McGill is no good." Let a boy make a poor lawyer and the people do not say the law schools are no good. There are even poor people in the pulpit and yet the people do not say it is the fault of the school of theology. But, let a boy go to a school of agriculture and when he comes out he dare not make a mistake at all because the people will jump right up and run down the agricultural institutions if he does so. I want to say that I plead with farmers to be as good sports as people in other professions.

My address is something like the old negro speaker who divided his text in two parts and said he would speak on the part that was in the text and the part that was not. Now I am going to speak about an instance that was brought to my attention in the winter. I was asked to speak on what the leader of the Y.M.C.A. called the rural problem. I asked him what it was and he said they read about the rural problems in the magazines. I said: "Look here; there are a great many rural problems." The problem just now is irrigation. With men who have a turn for economics the problem is marketing and production. If it was a clergyman who was speaking about the rural problem, one might expect it to be the falling off in the attendance in the country churches. What I think is the rural problem is the unfortunate and abnormal drifting of the young people from the country to the city. I need offer no apology for taking that up or making that statement. We must keep a more liberal percentage of our young people on the land if we are to make good. In reading up Roman history, I find the old writers lamenting the fact that the people were leaving the vineyards and flocking to the circus and the city—and Rome fell. That was the result of this migration. I do not say that we will fall that way. Once I was pleading for the retention of a bigger percentage of the boys and girls on the farms and a man took me to task and said: "Where would our lawyers and our preachers come from, if it were not for the boys on the farm?" And the people applauded. I often wonder if he saw the joke at the time. My answer to this was: "You are sticking up a straw man for the sake of knocking him down. A percentage of the boys will always feel that they should enter a certain amount of the so-called learned professions. I am speaking of the great army of young people who drift from the country to the city and nobody asks who or what they have been." This is the way I took it up with the boys at the university. There must be certain forces at work moving the young people from the country to the town life. For a short time we discussed the pulling forces. I asked the boys what were the pulling forces taking the boys from the farm, and one said shorter hours; another, more amusement; another boy, athletic development and sports; another boy said more comforts in the city. To the last one I said: "What do you mean?" He said: "Why, they have better comforts in the town. A fellow can get a bath in town when he wants it." I asked him if he really thought that had anything to do with pulling the boys off the farm, and he said "Yes." I said: "Probably you represent another generation, but I don't think it was the reason in my case." (Laughter.)

The only way we can meet this condition is to see what tends to push the boys away from the farm. There are a great many, I know. Some are outstanding. One is home conditions and surroundings. I am speaking about my province. There is room for a great improvement in the home conditions. I have seen people who have been out there some years and done well, but have fallen right into a rut so far as fixing up the home is concerned. Making the home attractive has a great deal to do with holding the young people there.

I attended a meeting of the United Farmers of Alberta and the Women's Auxiliary of that body, and I had to go easy there because the women were not unstinting in throwing the blame on the man for the condition of the home surroundings. I had spoken of the advantage of planting trees on the farm and some farmer said they couldn't get trees to grow there; others said they will live the first year and die then; others said we have a dry subsoil. A certain lady asked the question about trees in the first place. I told them how a man in Vermilion had dynamited his subsoil and got very good results with trees, and before I sat down the lady jumped up and said: "I would suggest you put the dynamite under the man first." (Laughter.)

Then there is the question of labour. The boy is proud of his hard work and will not complain of it even when there are times that he gets tired of it, or the irregular hours of labour, but the boy must have an interest in the work before he will like it. I can imagine a boy hating milking if he has to milk some of the poor old critters I see sometimes, but I can imagine him liking the milking if he knows and has the right kind of cow to milk. I can understand him having an interest in fat cattle if he knows something about feeding and the needs of the cattle he is feeding. There is only one way that that can be brought about and that is through the right kind of agricultural education.

Another point I would like to speak about is the social side, and Dr. Wesbrook spoke about that, too. I don't know much about British Columbia, only that I have had a good time in British Columbia for a day. I go to many Local Meetings of the United Farmers, or "Locals" as they are called in Alberta, and I can say that I do not know of any place where people get more enjoyment out of the meetings. I was scared when I went first because I knew I had to speak about some technical affair. Then I saw the seats were on skids. Then a man came in with a green bag, and that made me suspicious. Then a man told me they were going to have a dance as soon as I got through. So I told them I was going to cut my speech short. I remember one President of a Local introduced me this way. "You have to give him good attention for he is not going to take very long." Then he leaned over to me and said: "You take as long as they will stand for it." Then we had a talk and discussion and then supper and then a dance. I was talking about this in town to a lady, and she said about that dance: "Don't you consider it rather crude?" My only reply was that "If you knew more about home conditions in the country and knew just what that Local dance meant to the young people and the older people as well as I do, you would not speak that way about it, and, besides, I have yet to see where the latter day gymnastics in modern dances have anything on the old-fashioned quadrilles." (Applause.)

Then about athletic training in the country. There is no place where it would be more valuable and no place where there is less of it and the need of it greater than

in the country places. The lads in the school-house look at me when I say that as if I didn't know what I was talking about. We in the country always thought we could do away with three or four boys from the city. You will understand that what is required is more careful training. I have been thinking if something could be done along this line—something that will make the country life more attractive. That is a species of education that we must come to.

I would like to speak of one or two other things. One other, and to my mind it is the wrong attitude or outlook that the boy gets when he is small. That is why we want agricultural education in the public school. First, that the boy may see that the occupation of the father or mother is on a par with other professions. The boy will naturally get in his head a certain feeling if he listens to everything he hears about farm life not being so valuable. Besides that, if they get certain local papers and he sees the farmer taken off in some of the so-called humourous cuts and jokes, he is also going to get a wrong attitude there. We all know that these jokes and pictures are the same as with the Irishman.

Agricultural education should have a place in the schools because it is going to give the children the right viewpoint. The question comes up—how much agriculture can a school teacher teach? It is the trend of the mind induced in the child that counts. When he is older, that will not depart from him, and when he is older he will have a working interest in what is going on in agricultural research and all that pertains to it.

I have spoken in a general way on some of the points that are driving the young boy and girl from the farm. In the public school is the place to begin. Then, in the high school, because agriculture must be recognized as a paramount industry in our province. Then, there must be a school where the boy can get more agricultural education to get along with. Then, for the boy who has the time and means at his disposal there is no reason why he should not go on and get all that he is entitled to. If eight of the thirteen boys I have spoken of that we have in our college go back to the farm and if each of them settles down and lives out his life in a certain community and if he does what has been exemplified in his course, then we have done what we have hoped for.

I hope I have not been trying to boast of what we are doing in Alberta, or trying to do. I have just tried to set before you what ideals we have. I wish to thank you for this opportunity. (Loud applause.)

CHAIRMAN: I have an announcement to make which will probably be welcomed. The Local Board of Control has provided a very good brand of cigar, but before distributing them I would like to know if any lady has any objection to the gentlemen smoking. If she has, I would ask the lady to stand up. Thank you!

I will now call upon Dr. J. G. Rutherford, C.M.G., Superintendent of Agriculture and Animal Husbandry, Canadian Pacific Railway, Calgary, to address the convention. Owing to the lateness of the hour, it is proposed to change Professor W. T. MacDonald's address to to-morrow morning instead of this afternoon. I am sure you will appreciate very much Dr. Rutherford and also the opportunity of listening to these addresses this afternoon. Dr. Rutherford will now address you. (Applause.)

DR. RUTHERFORD: Mr. Chairman, Ladies and Gentlemen,—I can scarcely express my pleasurable gratification at hearing such excellent addresses on agricultural education as those which have been delivered this afternoon.

Forty years ago I was a student in the Agricultural College at Guelph, Ontario, at that time a rather primitive institution, but not by any means as primitive as the other means then available of securing agricultural education or any enlightenment in regard to the opportunities of agricultural science. Forty years ago the most outstanding feature of agricultural education was the distressing fact that there were practically no teachers who knew anything about scientific agriculture.

When you recall what has taken place in the last hundred years—I know I may have a bit of a reputation for this one hundred years of mine, but it is a way of bringing home to people some things they do not usually think about—when you consider that one hundred years ago when a man wanted to communicate with another man either personally or by messenger, he used exactly the same means as Abraham did to communicate with Isaac; less than ninety years ago, when a man wanted to travel from one place to another by land and did not have to walk, he used exactly the same means, only very slightly modified, as Pharoah did when he pursued the Israelites on their flight from Egypt. One hundred, or to be exact, one hundred and eight years ago when a man wanted to do anything requiring light after sundown he used the same apparatus only very slightly modified as Noah did when he had to milk the cow after dark. When you consider that one hundred years ago the number of people able to read and write in most civilized communities was about equal to the number who cannot read and write to-day, you will realize that the changes in the world's history during this very short period have been extraordinary. When you realize, further, that the human brain is physical exactly as the arm is physical; that it is only through use that the arm becomes developed and only by use that the brain becomes developed; when you consider the unparalleled rapidity with which education or, in other words, brain development, has been spreading in the last hundred years, the close connection between education and human progress becomes at once apparent. The extraordinary and notably cumulative advances achieved during the last century, and more especially during the last fifty years, are plainly attributable to the development, through education, of millions of human brains which without education would have remained fallow and unproductive.

As a young man, not quite a hundred years ago, but a very substantial slice out of a century, nevertheless, I was living in a town in Ontario in the practice of my profession. The evenings were long and there was a bowling alley where I used to occasionally develop my muscle. One evening there was a negro there, a fine specimen of the African race, who had come up from the Southern States by the underground railway before the war, a good citizen and a very skilful bowler. He was bowling against a prominent white citizen who was a great talker, one of the kind who can start their mouths going and walk away and leave them.

Well, this night he rattled the negro by his talk, and although the latter was a much better bowler, the white man got the best of the game. The darkey came back to the stand where I was and sat down. His lower lip was away down to about the third button on his vest, and he looked very unhappy. I said: "How is it So-and-so beat you; he has no right to beat you?" He said: "No, he aint got no

license to beat me." Then he sat for half a minute or so apparently thinking, and finally said: "Doctor, do you know, if that there man hadn't had a good education he would have been an idiot."

Later in my life I happened to be in an eleemosynary institution maintained by one of our provinces for the education of deaf and dumb children. I was intensely interested in seeing how the teachers opened up the minds of these poor children, many of whom had been in absolute mental darkness from birth simply because they were debarred from communication with others. Later I was in another institution maintained for the care of imbecile children, and there I specially noticed one little boy who was apparently brighter than the others, but who was deaf and dumb. I remembered the remark of the negro and what I had seen in the other place, and after observing this boy from time to time I succeeded in having him removed to the deaf and dumb institution where, after a course of training, he became as intelligent as most people. Prior to the awakening of the human race by the spread of general education, many brains were only very partially developed.

You may have observed that normal Scotsmen never say anything about the remarkable predominance of that race in the civilized world, in professional, commercial or financial undertakings. This is because the intelligent normal Scotsman knows that there is no special credit due to the race itself for this state of affairs, which is simply owing to the fact that the Scottish people have an advantage over the rest of the world in having had a good system of common school education established several centuries before the other countries woke up to the need of it. Generations of that education and the cumulative cerebral development arising therefrom have brought about in a perfectly natural way the acknowledged superior mentality of the Scot. Some unkind persons of other and less fortunate races sometimes claim that the brain development has brought about an enlargement of the national cranium, but of course being normal myself I have personally never felt any real racial superiority. (Applause.)

I can remember something else about education; when I came to Canada forty-one years ago, I lived in Toronto for a short time on a street called Bond Street, which led up to the Normal School on Gould Street. Every morning I noticed a most remarkable procession going up that street. They were young people, but mostly cripples. Some had a leg off. Some had an arm off. Some were going lame without the absence of a limb, but they were almost all more or less physically defective. I made enquiries as to this curious procession and I discovered that these were the Normal School students. I found out that it was the custom of the country that whenever a young fellow met with an accident and had an arm or a leg cut off, or was otherwise incapacitated for hard work on the farm, they made a teacher of him, and that the same applied to the girls—if they were not able for ordinary work or were crippled in the arm or leg or under the hat, they made teachers of them. (Laughter.)

It was quite a natural condition of a new country, and after all one could not blame the people for it, but it was rather a revelation to me, coming as I did from Scotland, where teaching is a regular profession into which people enter deliberately because of their supposed fitness for it and spend their lives as teachers, looked up to and respected as such. We, in Canada, have been following that somewhat crude

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method of providing teachers right up to the present day, only very slightly modified. Here, there is scarcely any real teaching profession outside of the universities. Teaching in the common and too often in the high schools is looked upon as a temporary occupation. A man goes into it as a means of raising sufficient money to put him through a course in the university, for the law or medicine or the church, and as for the girls—well, we know what happens to them. We have still a good way to go before education is given its proper place as the most important factor in our national development.

Coming now to agricultural education, I can remember some twenty-five years ago when I was a member of the Manitoba Legislature, getting myself very much disliked by the professors and pedagogues in Winnipeg because I advocated agricultural teaching in an agricultural province. I was looked upon as a re-actionary of the worst kind. You know, I need not tell you, that nearly all the pedagogues in Canada until recent years despised agriculture, looking upon it as an exceedingly vulgar and laborious calling, not to be considered in the same category as what they are pleased to call "the professions." A few years ago I was reading a paper before the Agricultural Branch of the British Association for the advancement of Science, and a discussion arose as to the advisability of making agriculture a section instead of a branch of that very great and learned body. The question was very solemnly considered. I have a keen recollection of a professor of astronomy ridiculing the proposition, saying that it was positively absurd to think of making agriculture a section of the association so long as the vastly more important science of astronomy remained only a branch. He was not the only moon-blind scientist, either, as the star-gazers carried the day and agriculture remained in the background as before. You can therefore imagine with what pleasure I have listened to these most intelligent and comprehensive addresses which have been delivered this afternoon. I see that we are getting along the road of progress. I see that the dreams I used to dream in my early life are coming true, and that we are going to have our whole system of education re-organized from the beginning up. Agriculture, which is the basis of our whole social fabric, by virtue of which we all live, move and have our being; without which we would all starve, and which has been neglected and put to one side for so long a time, is at last to be accorded its rightful place in our educational system.

The authorities in every province of the Dominion are now devoting the most careful attention to the question of agricultural education, and the subject is assuming greater importance from year to year. In the province of Alberta, where I have the honour to be a member of the Board of Agricultural Education, the policy of training the farmer's boy, for his future life work, as conceived and carried on by our energetic Minister of Agriculture, the Honourable Duncan Marshall, has already, although only a few years in operation, achieved most encouraging results. It is very gratifying indeed to one who has devoted his whole life, in one form or another, to agriculture and who has always been a keen advocate of agricultural education to see that the tide has turned at last and that the attitude of those occupying high places in the world of learning has undergone so great a change in this regard.

But this is not what I came here to talk about at all. The subject allotted to me this afternoon, if my memory serves me correctly, was live stock and irrigation.

Yes, that was it. Well, I don't know that I have very much to say about that. We had Dean Howes telling about the man who got up to preach and who spoke about the things that were in the text and the things that were not. If I went on to discuss irrigation and live stock, you would probably ask me why. After all, what is irrigation? Irrigation is simply farming under the ditch, that is all. If it were not necessary to have the ditch, if the heavens poured down a sufficient quantity of moisture, you would not need an artificial supply. There may be good farming or bad farming below the ditch just as there may be either without any ditch at all. Live stock is always an adjunct of good farming. So live stock and irrigation are co-related at all times. Good farming—good live stock. Without the good live stock you cannot have good farming, even if you have irrigation. If I were to preach on that text I would be, I am afraid, like the old Highland minister. He gave as his text: "The devil goeth about like a roaring lion," and he went on, reversing the construction of his sentences as they do in the Gaelic. "Firstly, my friends, who the tevil he was?" "Secondly, my friends, where the tevil he was going?" and "Thirdly, my friends, what the tevil he was roaring about?" (Laughter.) So, if I were to preach to you about irrigation and live stock, you would be quite justified in asking what I was roaring about. Every irrigation farmer, like every other farmer, knows that he must have live stock, and good live stock if he is to succeed in his operations. To illustrate the point I am endeavouring to make: Last winter the Economic and Development Commission was approached by the Fruit Growers of British Columbia with a complaint about the high cost of production of fruit in this province. I may say that I am afraid education was not the remedy they were in search of. We elicited some curious facts. We found that it cost the Nova Scotia farmer $1.25 to put a barrel of apples on the car f.o.b. We found that it cost the Ontario farmer $1.45 to $1.50 to put a slightly larger barrel of apples on the car and we finally found that it cost the British Columbia grower $3.60 to place a like quantity on the car. Now, there are several reasons for that. Some are good, and some are bad. Without going into them I want to say that the principal difference which will be patent to everybody is the fact that the Nova Scotia apple grower is generally a farmer, and the Ontario apple grower is also a farmer, whereas the British Columbia apple grower is an apple grower. This, among other things, would appear to indicate the advisability of an irrigation farmer being a good farmer and as such, having live stock about him. There are, of course, other reasons for this great disparity in cost of production, such as the expense of packing the three boxes, the great care exercised in selecting the best grades and so on, and these bring up the question as to whether the British Columbia growers have possibly gone a little too far in the matters of fine quality and elaborate packing. Of course, the luxurious millionaire especially of the lately risen variety—by the way, we have not quite as many of them in evidence as we had a few years ago—wants all his apples of one size and one colour and each with its own individual piece of tissue paper. On the other hand, the majority of the people living on the prairies want apples for apple pies and apple sauce and for the youngsters to eat and carry to school and they are not at all particular as to whether the apples are, or are not, packed in a beautiful box, all of the same colour and wrapped in the same kind of paper. If you want to get that market in competition with the Eastern grower you must get down to business

and send them apples without the frills, which cost money and are a serious factor in competition with people who can furnish the same article or possibly even an inferior article at a more moderate price. I am glad to know that a move has already been made in this direction and that some of the British Columbia growers are shipping the ordinary run of the orchards in less ornate and expensive packages.

If I have not tired you out I would like to speak a little while about live stock without any special reference to irrigation. I have been talking about live stock for a good many years. Live stock and mixed farming have been very much discussed in the prairie country, where soil exploitation masquerading under the name of development, has been rapidly diminishing the fertility of our soil. It is a fair subject for discussion here in British Columbia, because there is in this province a great opportunity for producing good live stock of all kinds; in fact, in point of quality, especially in some varieties, British Columbia is already well on the way to a leading position among the provinces of Canada.

What is the outlook in the live stock business? I may say that unless all signs fail, it was never as good as it is to-day. In the horse industry it is true that the motor car has very largely diminished the demand for the light-legged horse. I think I may say that as far as the light-legged horse is concerned, he is practically doomed. We of course do not know, but I trust, and I think there are good grounds for trusting, that after this war is over there will be no more demand for horses of the cavalry type. They will be a thing of the past. The motor car has taken the place of the light horse. The young man of to-day has given up the saddle. The light harness horse, although still of some use in courtship, will go out of business as soon as the self-guiding car comes on the market. Those who can afford to do so, use the motor car, and those who cannot, save up their money and buy those abominations called "motor cycles." (Laughter.)

For a number of years the heavy horse will be in demand. He is keenly in demand at the present time. Prices were never so high. After the war is over there will be a great demand for heavy work horses in the countries now ravaged by war.

I have in my possession an official publication from the Belgian Government giving many harrowing details as to what happened to the Belgian horses. The brood mares and foals running in the fields were slaughtered, being often used as targets by the German soldiers. One pure bred stallion, valued at 50,000 francs ($10,000), was burned up in his box while the groom and his wife and children were forced on their knees to watch the agonizing death of the noble animal. Then the Germans realized that they were making a mistake in destroying these valuable horses and began to ship them to Germany. They sent their experts to select the best individuals, giving to the Belgians for payment orders on the Republic of France, payable at Paris. These orders were in German and were often for the most trifling sums; in one case the owner of two valuable horses found on having his order translated that it called for payment for a pair of rabbits. As a result of these methods the Belgian horse has been practically exterminated in his native country.

I have no doubt that after the war is over, people will come over here from Belgium to purchase horses for breeding purposes and this may also occur in regard to other European breeds of heavy horses.

So far as the draft breeds generally are concerned, I do not think there will be a falling off in the demand for these horses for years to come. I have had interviews with representatives of all the large cartage companies in our cities and they say that so far as they have gone in trying out the motor trucks they have found the horse much more satisfactory and economical. It must not be forgotten in this connection that all of these gentlemen are, through long association, firm friends of the horse. Whether the development of the motor truck, which until comparatively recent years did not receive as much attention as that of the passenger car, will be taken up with energy enough to make it sufficiently economical to supersede the horse, I cannot say. The heavy farm tractor is a thing of the past. The light farm tractor has come in to stay. So far as the horse business is concerned, a man can continue to breed heavy horses without any risk of market failure for at least ten or fifteen years to come.

The majority of you are not so much interested in horses as in other kinds of live stock. There is a tremendous shortage of cattle all over the world. There is an extraordinary demand. The number of cattle in the United States has decreased by some seven millions in the last nine years, and that with many more people to feed. We have, in Canada, the same diminution going on although we lack the corresponding increase of meat-eating population. A feature of the situation very readily overlooked is that in addition to the great reduction in the numbers of cattle going to market as compared with the figures of a few years ago, many of the cattle are much smaller in size and of lighter weight than formerly, thus still further reducing the available beef supply. There has been a tremendous waste in the slaughter of calves. In the United States calf slaughter increased by six hundred per cent. in the decade between 1900 and 1910. I am glad to say that owing to attention having been called to this short-sighted policy, it has been to a large extent arrested both in the United States and in Canada. The matter has, however, been too long neglected, with the result that the world is face to face with a tremendous shortage of beef cattle. Again, as every one interested in the business knows only too well, it is practically impossible to procure good dairy cattle even at very high and scarcely remunerative figures. After the war, not only Germany, Austria, Italy and Belgium, but every other country in Europe will have been drained of its supply of cattle and there will be a tremendous demand for cattle and the prices will soar far beyond any figure that any of us has ever seen. I seldom assume the role of prophet, but I am firmly convinced that we shall see a tremendous market, all the more so because we have been neglecting the industry and allowing our stocks to be diminished.

The same is also true of hogs. The hog supply of the United States is at the present moment three million less than five years ago. In Canada we have such a shortage of hogs that it is quite impossible to supply our own demands from our own hogs and large quantities of American pork, hams and bacon are being shipped into our country to supply our needs. I feel satisfied that hogs, provided fair play is exercised on the market, will maintain a high figure for many years to come.

Similar conditions prevail in the sheep industry. Sheep have practically doubled in value during the last two years and the scarcity is well known. The United States supply is falling off and our own supply in Canada, small as it always

has been, has been still further seriously depleted. There is no question but that both mutton and wool are going to maintain very high prices for many years to come.

The facts being as stated, it must be apparent to all that the live stock industry should be safeguarded and encouraged as a national economic duty, all the more important because as matters now stand the same conditions prevail in that industry as have been referred to by Mr. Johnstone as existing in regard to fruit, namely, that there is too big a gap between the price received by the producer and that paid by the consumer.

Conditions in the live stock trade are particularly bad in the United States and Canada due to the fact that the buying end has been in the hands of experts who have made it their business to figure out how they could buy the live stock at the cheapest prices possible and sell it at the highest prices possible, while the majority of producers not being educated to the same point as the men with whom they have been doing business, are more or less at their mercy. At a meeting of the National Live Stock Association of the United States held at El Paso, Texas, last January, and at which our friend, Dr. Tolmie, of Victoria, attended as a delegate of our own Western Canada Live Stock Union, this matter was taken up in earnest. A committee was appointed and an enormous fund has since been raised to fight the beef trust in the United States with the object of securing to the producer the fair share of the profit which should be his. (Applause.)

The Canadian packer has always been exceedingly short-sighted; I beg his pardon—in one particular only.

He has utterly failed to grasp the outstanding fact that the time of low prices should be for him the time of small profits and that if he wants to keep the live stock industry up and in a flourishing condition, he should, when the supply is plentiful, pay the producer as much as he can, cutting his profit for the time being accordingly. He has failed to do that and instead has, as a rule, crowded the stock-growers down to the last fraction of a cent with the result that thousands of men have been disgusted and discouraged and have gone out of live stock production.

It is as easy to get into vicious circles in the live stock trade as in others. As an illustration, take the importation of Australian mutton. It first began because the supply of mutton produced in Western Canada was insufficient to satisfy the local demand. The same applies to the mutton imported from Oregon and Washington. There was not enough to supply the demand in Canada and, consequently, the packers went elsewhere for it. Freight rates were low, mutton was cheap, and then when the people in Alberta and the other western provinces began to produce sheep for the market, they could not sell at a living price because the foreign article could be laid down at a lower figure. If it had not been for an unexpected chain of circumstances, one of which was the increase in ocean freights due to the war, another the outbreak of foot and mouth disease in the United States, coupled with a rise in sheep values in that country, and still another, the high price now obtainable for wool, this unfortunate condition might have continued indefinitely. The sheep industry in Western Canada is experiencing a marked revival, but in spite of the high prices the number of sheep in the country to-day is so small owing to the first mentioned conditions, that very few people are deriving any advantage from the high prices of mutton and wool.

Now, how are we going to improve these conditions? We have had more or less discussion about education this afternoon and I am going to see if I cannot do a little in this line myself. We must educate ourselves to protect ourselves as producers of live stock.

First of all, we want the live stock industry in Canada put under government control. We want it taken care of and its interests served and studied out and looked after as carefully as are those of the producers of grain on our prairies. Men who were familiar with the conditions in the grain trade prior to 1900 know that the producer was getting very much the worst of it in disposing of his grain. They know that the conditions under which he was working were very bad indeed, but even at that they were no worse than the conditions with which the live stock industry is contending to-day.

By the amendments to the Grain Act made in and since 1900, by the appointment of the Grain Commission and by other measures taken to regulate the grain trade, the whole aspect of affairs has been changed and the present-day grain grower is sure of fair and equitable treatment from the time he puts his grain in the elevator or on board the car until he gets his returns. We want the same thing done with regard to live stock; we want all markets under the control of the Government; we want a commission appointed to look after the live stock industry; we want every live stock commission man and dealer bonded with the Government so that the cattle and the money of the producer will be safe in his hands; we want all the weigh scales in the hands of the Government; we want the whole business taken care of and looked after by the Government; that among other things is what governments are for. (Applause.)

I have recently been sitting as a member of the Economic and Development Commission appointed by the Dominion Government, and also of the Saskatchewan Royal Live Stock Commission, appointed to investigate the conditions affecting live stock and live stock markets in the three prairie provinces. There is now a good deal of evidence available before both these commissions in regard to these matters, and to my mind there is nothing of more importance to the country than this very subject. The Western Canada Live Stock Union, of which I happen to be President, at its annual convention held in Victoria last October, embodied this principle of government control in a resolution which had been endorsed prior to the meeting by every live stock association in Western Canada. It is a case for united effort and, as with every reform of a like nature, we must keep on pushing until we get what we want.

It should be borne in mind that the live stock industry of this western country is only in its infancy. When one considers the enormous area, practically a thousand miles square, which lies between the Red river and the Rocky mountains and between the forty-ninth parallel and the barren lands, to say nothing of the rich valleys and benches of British Columbia, when one considers that as the fertility of the virgin soil begins to show signs of exhaustion, the keeping of live stock on practically every farm will become not a matter of choice but of necessity; when one remembers the vast areas of land which for one reason or another can be used most advantageously for the breeding of live stock and its maintenance up to a certain stage of growth; the stupendous possibilities of

this western country in the matter of live stock production begin to impress themselves on one's mental vision.

When one bears in mind that the city of Chicago with a population of nearly three million people derives over fifty per cent of its financial transactions from the Union Stock Yards, the future importance of the live stock industry to this western country begins to be apparent. It should be evident to all that in the interest of those who will come after us, as well as in the interest of these now here, it is a matter of duty to use our best endeavours to secure the removal of existing grievances, to eliminate, as far as may be possible the obstacles and drawbacks now adversely affecting that industry, with the view of ensuring a fair deal to the live stock farmer both now and in the future. When reforms are in question there is no time like the present. We must have action now before the situation becomes any more acute.

Another important matter is that of live stock statistics. There are really no accurate or reliable figures available at the present time. Nobody knows how many horses, sheep or swine you have in the province of British Columbia to-day. Nobody knows how many there are in Alberta, in Saskatchewan, or in any other province. The Dominion Government makes a stab at it and says there are so many and the Provincial Government says there are so many, and neither is anywhere nearly right. The system of crop reporting, which includes live stock, is practically valueless. The Minister of Agriculture for France told me, when discussing the question of furnishing accurate figures for the International Institute of Agriculture, that this department had three hundred thousand crop reporters, but he knew very well that their figures were absolutely untrustworthy. The United States has attained greater accuracy than perhaps any other country, but there is even there always a wide discrepancy between the figures of the Census Bureau and those of the Department of Agriculture, and we are in an even worse position.

Before our live stock trade becomes further developed I want to see a statistical system established which will furnish accurate and reliable information as to the numbers and kinds of live stock in the various provinces of the Dominion. From information furnished to the Economic and Development Commission, an annual live stock census for the whole of Canada can be provided, for approximately one hundred thousand dollars. In view of the fact that the live stock of the Dominion is valued at eight hundred million dollars, the first mentioned sum is not much to ask from a Government that can spend so many millions of dollars on other things. (Applause.)

As an illustration of the importance to the producer of knowledge of this kind, I may point out that in the Alberta Stock Yards at Calgary there were handled in 1913 only 26,000 hogs, while in 1914 the number of hogs passing through these yards was 194,000. There was a vague general impression that there were more hogs in the country than there had been in the previous year, but there was no way by which the producer, the man most vitally interested, could ascertain the actual facts and govern himself accordingly. Those interested in the buying end, many of whom have very extensive and systematic connections for the purpose, can and do ascertain the actual conditions throughout the country, at least in a general way. The isolated producer has however no opportunity of obtaining this knowledge,

without which it is very difficult for him to decide as to whether the price the buyer offers is a fair price or not.

The third point is that we need money and must have it. Last year ninety thousand head of cattle went from Saskatchewan, Alberta and Manitoba to the United States. Some of these cattle were fat and as at least a partially finished

Bridge over Thompson River, Kamloops, B.C.

product, no reasonable objection could be offered to their exportation. Nearly seventy thousand of those cattle, however, were stockers and feeders, among them a large number of excellent cows and heifers. Their estimated average value was $54. We had millions of tons of feed that went to waste last winter for want of stock to eat it up. When a Yankee comes across to the Winnipeg Yards or to the Alberta Stock Yards and buys these young cattle and takes them home with him he does not do it out of any sentiment of love or affection either for us or for our cattle; nor does he do it for fun; he does it for the same reason that the pilgrims go to Mecca; he does it for the sake of the profit. He buys these cattle to take south and make money out of them, and we know that they will average well on to $50 a head profit. They were probably worth that much more this spring than when he bought them last winter.

You will understand that these seventy thousand cattle went from here last year for the simple reason that the man who had the cattle did not have the feed, and the man who had the feed did not have the cattle nor the money with which to buy them. Plainly stated, that is what this movement of cattle meant. If the man who had the feed had had the money or had been able to go to the bank and get the money to buy some of these cattle and carry them over the winter, this country would have made the profit instead of the United States. I have no objection to

the United States making money, but there is no reason why they should make it at our expense.

It is up to the financial magnates of the Dominion to look into matters of this kind and take the proper steps to remedy the evil. Some system should be inaugurated in Canada whereby the man who has the feed can get the cattle.

In the United States they have a way of working it out. They have a number of live stock banks which practically confine their operations to the furnishing of live stock loans. These banks are largely owned and operated by combinations of live stock commission men in Chicago and other stock centres. Then there are a great many live stock loan companies which borrow money, chiefly from eastern banks at a low rate of interest and lend it to stockmen on cattle at a considerably higher rate. They lend it at eight per cent as a general rule and as they borrow from the banks at from five to six per cent, they are able to do business on a safe margin.

The operations of some of these loan companies are rather extensive. I know of one live stock loan company which has a capital of two hundred thousand dollars of which but one hundred thousand dollars is paid up. Last year this company made loans on cattle to the extent of nearly two and a half million dollars and the profits on the year's business were over eighty-five thousand dollars; a very nice clean up on a capital of one hundred thousand.

These companies, while not directly financed by the large packing companies, are frequently vouched for by them, and that is a condition which we are not particularly anxious to have in Canada. I know the National Live Stock Association of the United States is very dubious of this godfather.

These loans are generally made for six months, which gives the farmer a chance to graze stock for the summer or to winter-feed, as best suits his circumstances. Extensions are frequently given when market or other conditions render this necessary or advisable, but it is rather disagreeable for the borrower to know that the money is under the control of the packer who buys his cattle. Our farmer friends in the United States are not in a very pleasant state of mind over this feature of the system, which has nevertheless been of great benefit to them.

All things considered, it will be much better for the Canadian farmer to obtain his working funds directly from our own reliable chartered banks, provided the latter will take hold of the matter in earnest and devise some fair and reasonable method of making advances, adequate in amount and for periods sufficiently long to permit of the handling of live stock in a practial and business-like way.

Under the present system, our big chartered banks send out to the country branches, as managers, many estimable young men. The young manager, however, very often does not know how the farmer lives, moves and has his being. Frequently he does not get a chance to stay long enough in the community to get acquainted with the farmers resident in the neighbourhood, either socially or in a business way.

This is bad from almost every point of view as unless and until a bank manager is able to form an opinion as to the financial morality of his various customers, he and they are very heavily handicapped in the carrying on of business relations. Many of these banks are located in centres where there are four or five others, and where one or two with older and more experienced managers would serve the public much better. If one of these young managers makes an earnest

effort to get acquainted with his customers and their affairs, if he takes an intelligent and active interest in his work, in other words, if he shows initiative and energy enough to attract the favourable attention of his superiors, he is very shortly promoted to a larger branch, with the result that the connection he was forming, as valuable to the community as to the bank itself, is lost right there. If the banks hope to do business in farming communities in such a way as to assist in the building up of a sound and sane agricultural system and prevent such economic losses as that to which your attention has just been directed, they will have to select their local managers with great care, giving the preference to those capable of taking an intelligent interest in all matters pertaining to farming. The men who succeed in securing the confidence and the business of the farming public should be encouraged to remain among the people they know and who know them. It will, I am sure, prove to be much better business to increase their salaries and leave them where they can be of the greatest service, than to promote them to other and perhaps more important branches, thus losing the valuable personal connections which they have established. Unless some such policy differing widely from that now in vogue, is adopted in the near future, the banks will find that some other way of securing agricultural short term credits will shortly come into being. (Applause.)

I may say, before I leave this subject, that I was recently told by a gentleman in whose veracity I have entire confidence, of a friend of his who had a chance to make some money in cattle and his credit being good, he borrowed some $20,000 from a bank, with which he bought cows. All the cows proved to be in calf and the profits were in sight and looked very promising when his note was called. He told the bank that he had not the money available; that it was invested in the cows, which were doing well. The banker informed him that he had orders from head office that all loans must be straightened up. The borrower told the banker that he could pay $7,000, but payment in full was insisted on. So he sold the cattle, incidentally making a thousand dollars. A friend of his remarked that he could have made $2,500 easily by holding the cattle until spring, and he replied that he knew that but that he did not have the money to do so and pay the note, but he said: "The thing that makes me so mad about it is that when I paid that $20,000 loan, the manager turned round and said: 'Now would you like to borrow some more money?'"

I want to see a better deal handed out to the people of these western provinces in regard to the live stock industry.

The fourth point which I wish to briefly discuss is co-operation—co-operation, not only in production, but in the handling and marketing of live stock and live stock products. Co-operation has taken a long time to get a foothold. Denmark is the greatest co-operative country in the world. They have gone on improving their co-operative system there for the last forty years. Even in Ireland, which is the last country in the world where one would look for co-operation, especially in the light of the events of the past three or four years, co-operation is making good headway. We find that in the co-operative marketing of cattle in the state of Wisconsin people are making $70 to $85 a car more than they did when selling direct to the cattle buyer. In Litchfield, Minnesota, they are doing even better than that. In our own province of Saskatchewan a large number of co-operative

circles have been established and a great many cars have been shipped by them with most encouraging results. We know what has been achieved by co-operative action among the grain growers of the plains. We know the benefits derived from co-operation by the fruit growers of California, an excellent example which is, I am glad to say, beginning to be followed by the orchardists of British Columbia. I would like to see a co-operative circle established in every farming community. If properly started and carried on with energy and intelligence, it will very soon begin to extend its activities in many different directions, to the great advantage of its members, socially and morally as well as financially. We want the co-operation of the townspeople as well. Nothing improves conditions in the farming community and in the town more certainly and more satisfactorily than sympathy and understanding between the man in the town and the man in the country. If that spirit had been cultivated years ago the big organizations to which I have referred, the Grain Growers and the United Farmers, would have taken an entirely different form. The interests of the man on the land and his neighbour in the town are, after all, identical, but the farmer is not to blame for the lack of general recognition of this basic fact. The farmer was forced to organize to protect his rights and secure square dealing from the so-called business interests as the latter lacked the vision to see that in a country such as ours prosperity for the man on the land means prosperity for all. In the city of Lethbridge three years ago there was not a farmer on the Board of Trade, but now they have the farmers fully represented on that body, equally with other lines, and when any question of general interest to the district comes up for discussion it is considered jointly by the farmers and business men.

This principle is extended to include all public meetings called to deal with any important local issues and, needless to say, it is working out greatly to the general benefit of the entire community. We need more co-operation between the city and the country. Talk about agricultural education and the teaching of agriculture to the boys and girls in the schools! What better influence could be employed than to have the children in the country visiting the children in town and the children in town visiting the children in the country, and the parents going in and out as well? The majority of people now have good means of locomotion. If you can bring the town folks and the country folks together more, not only socially but in the various lines of public effort and public service, the problem of rural education for city children and city education for rural children would largely solve itself. It is only a matter of mixing up thoroughly and banishing the feeling of aloofness which breeds misunderstanding and the spirit of co-operation will take its place. Some of you may think that these ideas are visionary and Utopian. You will recollect that when I began to speak an hour or two ago, I dwelt upon the progress this world has made in the last one hundred years. I like to tell an audience that. It makes men sit up and consider what a really extraordinary age we are living in. In view of the facts I have mentioned, this world is only about two hundred years old. We have made more progress in the last century than we made in all the thousands of years preceding it. Think about it when you have a few moments to spare.

A battalion went to England and camped down at Shorncliffe on the sea. One of the officers, who was from Alberta, took a chap—also from that province—

who, like himself, had never seen the sea until he went on the ship to Britain, and posted him as a sentry down on the sea shore. He planted him on the sands with orders to stay there until he was relieved, and left him. When the allotted time was up, he went back and looked all round but he did not see his sentry. Finally he saw the head of the man—away out—just above the water, and he called out: "What are you doing out there? Didn't I tell you to stay here?" The sentry

Bridge over South Thompson River, Kamloops, B.C.

called back: "No, sir. You told me to stay out here, but this here creek has riz." (Laughter.) These ideas I have been speaking about were ridiculed twenty years ago. They were in advance of the times five years ago, but now, "the creek has riz." Times have changed, and it is up to us not only to talk about, but to do these things. I would remind you that whatever men dare they can do; all that is necessary is to get together.

There is still another viewpoint. The weavers of Paisley were great thinkers and noted reformers. Until comparatively recent years Britain maintained a fleet known as the Channel Fleet which, once a year, made a voyage round the United Kingdom, calling at a number of the principal ports. On one occasion, when this fleet was anchored at the Tail of the Bank, off Greenock, an old Paisley body went down to have a look at it. He went aboard the flagship and made a very thorough inspection of every nook and cranny to which he could gain access. Finally he attempted to walk into the admiral's private cabin, but was halted by a smart English marine who was on sentry duty there and who asked him, rather peremptorily, what he wanted. "Weel," said the weaver, "I was just gaun in to hae a bit crack wi' Admiral Hornby." "Oh," said the jolly, thinking to have some fun

with this curious Scot, "the Admiral isn't aboard; he's ashore, but 'oo shall I say did him the honour o' callin'?" The old man looked over his glasses and very simply replied: "Ye might just tell him that wan of the owners was aboard."

We are apt to forget that we are the owners. We are apt to forget in the strife of the political fight when we are led by the nose by one party and by the ear by another party that if we really want any legislation and will say so emphatically, we can have it. We are the owners. (Loud applause.)

CHAIRMAN: It is so late now that any discussion there may be on this address of Dr. Rutherford's will be heard and considered at the session to-morrow morning.

MR. LAWRENCE: I would like to just mention the products in front of the platform. These are all products of Kamloops and have not been brought from California. Those ripe cherries hanging there are proof of the honesty of the audience, and Mr. Johnstone, who brought them here, has the utmost confidence in the audience or he would have a special constable to guard them.

The session was then closed and the convention adjourned to eight o'clock p.m.

TUESDAY EVENING SESSION, JULY 25, 1916

CHAIRMAN: The first item on our programme this evening is an address by Mr. J. E. Tedder, Chairman, Hydro-Electric Committee, Kamloops, on "The Possibilities of Irrigation by a Hydro-Electric Power Plant in the Thompson Valley."

MR. TEDDER: Mr. Chairman, Ladies and Gentlemen,—Irrigation, I believe, is acknowledged to be the oldest of the artifices adopted by man to make up for the deficiencies or inequalities of nature in enabling him to supply his needs. In a primitive sort of way it was practised in Egypt and India in the most distant times and the genius of western civilization in our own age has enabled those antiquated systems to be extended enormously in their beneficial application to the service of mankind. It is, however, scarcely necessary for me to dwell upon the fact that these anciently peopled lands are not to be taken as typical of all countries where irrigation is practised. The modern plan is meant often to apply to a state of things unknown in Egypt and India. It by no means follows in our day that an area marked out for irrigation is necessarily parched and dry land, a fallacy only too widely accepted by those whose knowledge of this vastly important subject scarcely goes beyond the school-book age. You will forgive me, I am sure, if I find refuge, however, in these elementary principles of a subject in which all these present here to-day have arrived at that stage, when perfected knowledge in this all-absorbing topic, is merely the spring board to still new ideas, new fields to conquer, and new methods of harnessing the forces of boundless nature. Before I delve into the rambling details which go to support any theories of usefulness concerning the Hydro-Electric system of this city of ours, I am intending to set my mind at rest that it does not necessarily follow that a district almost a stranger to the gentle dew of heaven is the only one where the devices of man are necessary to trick the waters of the earth from the courses

hewn by them down through the ages. I am assuming then that, a district may have ample rainfall, and its soil may be of an exceptionally good quality for pasture land, on which sheep and cattle may be grazed with profit, or it may even be suitable for growing wheat or other grain. But I presume, and this appears to me to be the fundamental basis of national development, that if population can be secured it may be possible to make it provide a living for ten or a hundred times that number of people if properly irrigated. Given a convenient waterway and a solution to the puzzle oftimes presented in the penning back, diversion, conversion, or any other means of hand-cuffing the capital necessary to carry out such beneficial work, it not only pays to convert such a tract of country such as I have instanced into an irrigation settlement, in duty to the land that awaits the master-hand, but it also explodes the theory nursed by the would-be farmer that he cannot farm in a comparatively dry climate on account of the uncertain rainfall. Here in this district, then, that excuse may be discovered, but, I venture to believe it is deep down, in fact considerably overgrown by the more fruitful theories that are bound to be born of an inventive mind, which is the obviously resultant state of being arrived at by an irrigationist, once he has even in the most primitive fashion, gone to the trouble of appreciating nature's bountiful gifts, whose sterling worth may be daily enhanced according to the amount of industry the man of the land cares to expend, and according to the breadth of vision he possesses.

It is a matter of considerable difficulty for the veriest novice to appear before such a distinguished audience as this, for my very imperfect knowledge of the subject which has doubtless formed the life-study of most of you will I fear be not as convincing as I would like it to be. However, in as brief a manner as I possibly can I will attempt to justify my foregoing remarks concerning the possibilities held out to the farmer if he will avail himself of a system whereby the abundance of water in this locality may be made to do anything, go anywhere, in fact, accomplish almost everything but speech.

For your general information I may be pardoned a little diversion in the way of a few historical facts relative to the water and light system of the city of Kamloops. In the year 1895, that is two years after the city's incorporation, the water and electric light plants which did service at that time were owned and operated by private enterprise. The gradual growth in importance of this city and locality very naturally soon made itself felt and the demand for these two important commodities likewise increased to such an extent that the plant referred to was soon found to be totally inadequate for the continually increasing demands made upon it. A not unusual situation rapidly arose; private enterprise was not capable of the financial expansion essential as a means to increased production. The municipal authorities arrived at that stage when steps to acquire the plant then in operation became absolutely necessary for the provision of the growing needs of the populace and the industrial requirements of the community in general. To those of you who may have chanced a walk in the park grounds and on to the city wharf it will be interesting to note that on the river bank close to where the wharf stands to-day a power house of frame construction was erected in which two pumps and one electric generator were installed. This, then, may be taken as the city's first venture in municipal ownership with regard to the supply of water and electric light.

Scarcely four years had elapsed ere it became apparent that by virtue of good fortune the city's growth again demanded more light and more water, but this time deliberate plans were made with an extremely optimistic outlook and the advice of a consulting engineer resulted in the provision of such new equipment calculated to meet every possible demand for the ensuing ten or fifteen years. The building situated a little to the west of this hall on Lorne Street was erected in accordance with expert advice in the year 1899, while its equipment consisted of pumps and electric generators much more efficient and of a considerably larger capacity than those upon which the city had depended for the previous four years. Ten years afterwards Kamloops seemed to be destined to reach a breadth of development that would outstrip the most hopeful estimate ten years prior, and again the burning subject was how to keep abreast of the times. The increasing cost of fuel at this period led to a search for other natural and cheaper possessions from which auxiliary development of power might be obtained. A reputable firm of engineers were consulted with regard to the possibilities of water power and upon their advice, authorization was given for thorough investigation to be made in respect of water sites in the neighbourhood. In the meantime, however, the plant in the building below already referred to demanded immediate relief, and steps were, therefore, taken to install a large generator and extra boiler capacity for the purpose of sharing the over-load on the existing machinery. Observations over a considerable period were taken on the Barriere river in order to ascertain what amount of water could be depended upon throughout the year which showed that a minimum capacity of two thousand horse-power could be developed, which was also capable of increase to ten thousand by creating storage on the Barriere lakes. With as definite an assurance as the laws of nature permit, the municipal authorities undertook to proceed with the initial development of two thousand horse-power, which could be increased from time to time as required by units of one thousand horse-power each.

The vagaries of climatic conditions, however, were borne in mind, and a supplementary steam power station of like capacity was provided for as a stand-by, in case of emergency. The steam plant was thus erected, the necessary machinery installed, and it began its era of usefulness in the fall of 1913, awaiting the day when it would be merely on the look out for accidents when the Hydro-Electric enterprise should commence operation. This latter was declared ready for trials at the end of 1914, in fact, so satisfactory were they that two months of actual work stood to its credit when, as was naturally anticipated, certain flaws developed and minor slides took place, which necessitated a period of adjustment. In the early days of 1915 the Hydro-Electric system of Kamloops was deemed ready for its long run, and what is more it is still running. It has taken a long time to provide you with the means to produce the theme for which I aimed and in which you are directly concerned. My reason, however, for quoting you so much detail may be attributed to my belief that you, as experts in the art of irrigation, require to be convinced that the man-made equipment is capable of harnessing nature's forces in a manner that is at once effective and permanent.

I am now going to assume the attitude of the auctioneer, for it is here that I am in a position to proclaim to all and sundry that the corporation of the city of Kamloops is ready to sell and deliver the goods, a colloquialism that may be pardoned. The magnitude of this undertaking for a city the size of Kamloops will

suggest at once that the mere supply of water and light for actual needs was only a part of the vision seen by the sponsors of the Hydro-Electric scheme. How to utilize the power still capable of development is an enquiry providing its own answer immediately;—irrigation, industrial expansion, and the present and future general manufacturing needs. The very nature of the community in which you find yourselves to-day provides, likewise, its own recommendations in relation to electric power for the purpose of pumping water on to the rich lands adjacent to the rivers and lakes with which the whole Kamloops district abounds. With the two thousand horse-power already developed it will be appreciated that all needs are supplied for the present. Furthermore, the fact that there are considerable periods of each day when electricity is not needed for lighting purposes is to be considered. It is here where an asset to both the agriculturist and the manufacturer lies, in that the corporation is eager to sell that power during its hours of inactivity at a very low price, so low, in fact, that the man on the land, while many miles from an industrial centre, may avail himself of the most advance processes known to modern science for the enrichment of vast tracts of land where, hitherto, the dominant crop has been prolific sage brush.

It does not require the brain of a Lord Kelvin to support the claim that electricity offers the cheapest and easiest method of commanding the waters of the earth to do the bidding of man in the fields of cultivation. This is of vast importance in this district, named, and rightly so, the Dry Belt, where irrigation for the most part is carried on in a more or less primitive and uncertain fashion, by a dependence on winter snows and fortunate spring rains. Conserving and relying upon such waters, while doubtless adequate if Dame Fortune smiles, is at once precarious and not to be compared with a supply of moisture in all quantities, at all times and with a source of supply regulated as it were by a simple touch of the button.

To make water ascend the gentle slopes and on to the excellent bench lands, then, I am convinced that mechanical pumping by electrical means is the key to bigger crops, less worry and, withal, expenses down to the irreducible minimum. The effect on crops at the critical spring period when dependence on gravity water supply is tempered with the fear of a shortage at a later and hotter date, is easier of understanding than description. The advantages of good spring growth are reflected in the more lucrative prices obtained in an early market. This early market is assured when the water supply in the spring is right and continues to be right until the crop is harvested.

Some very interesting figures as given out by the Dominion Experimental Farm at Lethbridge, covering a period of seven years, 1908-1914, wherein will be observed an increase per acre on irrigated lands; Wheat, twenty bushels; Oats, forty-two bushels; Barley, thirty-nine bushels; Potatoes, two hundred and fifty-nine bushels. The tests were taken in comparison with non-irrigated lands in the same locality. These figures should be borne in mind when the subject of initial costs have to be weighed, incident to the installation of an electric pumping plant for it is here that the cold benefits represented by so much cash increase warrant the use of up-to-date means for irrigating purposes.

The following figures will give an accurate idea of the comparative cost to irrigate one hundred acres using one acre-foot per season for every ten feet lift:

Gasoline at 27c will cost 98c per acre.
Distillate at 22½c will cost 81c per acre.
Electricity at 1½c per kw., 50c per acre.

These figures, of course, speak for themselves, but, added to the cheapness of electric power are other important factors, flexibility and reliability.

No matter how prosperous a farming community may be, there is bound to exist the problem of financing, and, realizing the delicacies that beset the thorny path of solution to this question, I do not propose to weary you with any amateurish schemes. But, I do wish you to carry away with you the idea that the Hydro-Electric plant is surely capable of supplying the power adequate to compel any quantity of water in this district to go wherever and whenever it is required, once the necessary pumping equipment has been established. To my mind, however, those burdensome initial expenditures may be considerably modified either by adopting the community plant plan, or by bringing pressure to bear on the Government for the desired aid by loan, or such other manner possible. The extension of irrigation on modern lines in this district should be uppermost in the mind of every man of the land, for it is only by continual agricultural development that this great and glorious Dominion may retain for itself the proud title "The garden of the Empire." (Applause.)

MR. J. H. WOODWARD: Mr. Chairman, I would like to put before the speaker the estimate he has given on that fifty cents an acre-foot and ask what height does he lift the water at fifty cents an acre? He has given the cost of gasoline and distillate but he has not given the cost of heavy oil and heavy oil is very near one-third cheaper than distillate or gasoline, so that I think his estimates are a little out. I enquired for his estimate and got them for the summer at 2½ cents, but even at 1½ cents the cost is a little higher than crude oil. I figure that instead of 50 cents an acre-foot, by allowing 2½ horse-power to lift an acre-foot, it will cost 84 cents instead of 50 cents. I think his figures must be out. I do not suppose there is time for discussing that but I would like that taken up with Mr. Tedder.

CHAIRMAN: I would suggest that you should take that up with Mr. Tedder direct. He has had to leave, unfortunately, immediately after delivering his address. I think the Secretary has some announcement to make.

MR. RANKIN: (Reads interesting war bulletins just received off the wires which were received with great interest.)

CHAIRMAN: The next item on the programme is an illustrated lecture by Professor W. S. Thornber, State College of Agriculture, Pullman, Washington.

While the lantern is being placed in readiness, Miss Brown, who entertained us so well this morning, has kindly consented to favour us with another solo.

Miss Brown then entertained the convention by singing "Good-Bye Summer." (Applause.)

PROFESSOR THORNBER: It is with real pleasure that I again return to your beautiful town of Kamloops. Several years ago I was permitted to make a careful

study of your agricultural possibilities, and am certainly pleased to note the splendid progress that your community has made since my last visit. It is always a pleasure to meet with you people and consider together the real problems confronting the farmers, because we always get something of real practical value from our conferences.

Canadian Northern Railway Bridge over North Thompson River, Kamloops, B.C.

WATER A FACTOR IN COMMUNITY DEVELOPMENT

The subject assigned to me is one that bears close relationship to every factor in the final development of a community and the earlier and more thoroughly all these factors are considered nearer perfect development will the community have.

The growth of a community is an evolution of the largest kind and final development must not be expected in a year or even ten years. In fact our most successful communities have been developed out of a series of very radical changes. Rarely or ever does a community start at once in the developing of an industry that remains the principal industry of the community. The history of the evolution of some of our most successful agricultural communities shows that their principal industry at the present time is the result of a series of misfortunes and failures, and while man thought he was the deciding factor he has proven to be only an incident in the development.

If a community would be successful it must early in its development learn the true meaning of co-operation. Community co-operation means more than the mere getting together of a few of the good business men of the town. This co-operation must include not only the business men, the teachers, the preachers and the farmers, but also the wives of these men. Every person must be interested in some way or

other or the best results cannot be attained. It is absolute folly for a few men to endeavour to bear the load of a community when all are to be benefited by the development.

There are certain factors essential to every real live rural community and while some have apparently made progress without all of these factors being considered, it is interesting to note their deficiencies.

I have in mind a community that is famous for its Percheron horses and colts and what wonderful animals they produce. Their barns show that the people are interested in horses, but their school houses are a disgrace even to the poorest of communities and while they have won many prizes on horses and colts, no one has ever heard, outside of their immediate neighbourhood, of their boys and girls.

I would like to submit seven factors as a community measure and while I may not place them in their real order of importance, yet I am sure that they will be worthy of consideration. I maintain that these factors govern the possibilities of an agricultural community.

1. The Productivity of the Soil.
2. Market and Transportation Facilities.
3. Good Roads and Streets.
4. Good Schools and Churches.
5. An Intelligent Reading People.
6. Suitable Parks and Recreation Grounds.
7. Pleasant, Comfortable, Beautiful Homes.

A careful study of these factors will show the ideal in rural life, however—not the imaginary unobtainable, but the possible which must exist for the best conditions.

The productivity of the soil very largely governs the land values. It especially does when taken into consideration with the market and transportation facilities, and there is a close relationship existing between land values and the class of farmers coming.

The improvement of the roadway must mean more than the grade, drainage and surface. It should include the roadsides and road plantings. In many districts noxious weeds and destructive pests are religiously fought in the fields and unmolested along the roadsides.

If climatical conditions will permit the planting of nut trees along the roadside no better investment can be made to the adjoining farms. If roadside tree planting is not feasible, then by all means utilize the land with a clover, alfalfa or other hay crop and make that land as profitable as the balance of the land. It has been said that high-priced lands attract highly successful farmers while low-priced lands means many failures. While it is possible to measure the productivity of the soil, so much depends upon the intelligence of the operator that in reality this important factor becomes secondary.

The market and transportation facilities have become the most important of all factors. It is useless to produce a crop for which there is no market or even worse no transportation facilities. Most farm crops cannot walk to market, but must be hauled and, while a certain locality may have the most favourable conditions possible for the production of apples, wheat or corn, if transportation facilities are not good then it will be better to produce hogs, cattle or horses, a crop that may be driven to market rather than a grain or fruit crop.

The market problem is a keen one and must be given consideration or failure is sure to come. It is not a problem for the producer to solve alone, but it is one in which we are all interested and solution will come only when townsman and countryman co-operate in this problem.

The progressiveness of a country can most accurately be measured by the roads. Good roads at all seasons of the year are an unmeasurable asset to every farm served by them. This means that the crop can be marketed when prices are best. It likewise makes possible the utilization of the teams for general hauling at a time when they are usually idle. In addition to assisting in the marketing problem, good roads are doing more to solve the rural social problem than all other factors combined.

The schools and churches of a community must be so closely related that their activities will perfectly co-ordinate. Both institutions must be educational as well as character builders. Personally, I can see no reason why ancient history or literature taught in a Sunday school by the same teacher or one equally as good as teaches in the day school should not be given credit in the regular school work.

Education is education wherever you get it and the sooner we get away from the belief that culture only comes from the study of those things that were written about generations ago, then the greater will our progress be.

Too often we elect a school board, instruct them to employ teachers and figuratively say, now we have done our duty, you do yours. What do you suppose would happen if all of the parents were interested in the men and women who are teaching our boys and girls. I wonder what would happen if some of our school boards were requested to see to it that our boys were given training along lines that would make it easier for them to earn an honest living after school years, and that our girls were given instruction in home economics and that instead of turning out from our schools men and women who are not prepared to do anything specially we actually equip these young people for something useful.

If our big crop and best crop is boys and girls, let us never lose sight of this one fact and let us prepare it the best way we know how. Let us quit trying to make preachers, lawyers, doctors and teachers out of material that is intended for farmers, mechanics and housewives. Let us see to it that all industrial activities are represented in our schools.

Now that people have passed that period of belief in many places that the pastor was different from other men and agree that the church can profitably be used as a community centre, our religion is going to serve a purpose to man.

I never could understand why anywhere from $3,000 to $40,000 and $50,000 should be tied up in a church building in a community for the use of from 25 per cent to 30 per cent of the people, six to seven hours per week. It is poor business. No firm, however wealthy, could afford to do it, and yet we find a few churches doing this very thing yet and wondering why they have not the support of the entire community.

The church should be a part of the community. Its Sunday School, Young People's Society, Ladies' Aid and Business Men's organizations each have a great field of work and when properly incorporated into the community eliminate laws, ordinances and influences absolutely detrimental to the good of civilization.

One of the most difficult problems in community work is to get people generally interested in profitable reading. This is especially true of rural communities. Rural activities during a part of the year on account of out-door exercise tires the body and, in a measure, unfits the system for deep study. However, by careful planning and proper presentation, interest can be created and marked results secured. Extensive use should be made of the governmental and college publications. Closely affiliated with reading is the problem of community lectures, musical programmes and other entertainments. With the introduction of extension services into our college activities many communities are availing themselves of the privileges of this work and hundreds of lectures, addresses and moving picture entertainments are annually being held as a result.

The great American problem of making more money has so thoroughly permeated the people that we have almost forgotten how to play. We don't play enough and when we do play instead of all taking part in the game, we hire a few professional baseball players, pay a fancy admission price, sometimes bet our money on the game, and watch them play. This is not recreation; it is "spendation," and the players get the exercise and the money and what do we get?

Our rural recreation parks should have the following factors:

1. Central hall for indoor activities, contests and exhibits.
2. Play ground for outdoor fairs and sports.
3. Picnic grounds for picnics, camp ground, etc.
4. A swimming pool wherever it is possible.

The evolution of the rural fair has reached the point where it is little better in many places than a carnival company with every form of game of chance possible. Is it possible that the rural folk can no longer enjoy themselves without balloon ascensions, gambling accessories and fixed horse races? Are we no longer interested in the best products of the farms and the true skill of rural folk? Why isn't there just as much skill in ploughing a nice, clean, straight furrow, showing a fine team of draft horses, sowing broadcast by hand a patch of grain or cradling a swath of clover of alfalfa as there is in doing some of the stunts we now try to do?

If you must throw baseballs at the negro babies or toss croquet balls into tilted beer kegs, let us not sell the concessions, but do this under the management of the fair and leave the money for the betterment of the community.

The recreation should be broad enough to include all classes and ages of the rural folks and the completed plan must take into consideration perfect manhood—mentally, morally and physically.

While the community is the unit of the state, the home is the unit of the community and without good, pleasant homes, no community can progress.

Country houses are too frequently built without consideration as to their surroundings or use. They need not be large, but they should be on good lines properly painted or stained, well lighted and surrounded with grounds in keeping with other rural considerations.

Finally a community should select a series of crops that will work well into its activities, soil conditions and water supply. These crops will depend largely upon the market conditions, transportation facilities, climate and likes of the people.

Some parts of the community will have land not adapted to regular crops. This land should be utilized to the best advantage with pasture crops. If grass will

Miss Jessie Brown, Soloist at the Convention

not grow, it is possible that fall rye will. If alfalfa cannot be established as a regular crop, it may be advantageous to transplant one or two-year old plants as it has been found necessary in some other dry parts of the States.

. . . . . .

Professor Thornber then proceeded to show a series of very interesting slides depicting the development of a community from "bunch grass" to homes, and especially showing the utilization of water in community growth.

CHAIRMAN: The next item on to-night's programme is not definitely stated on the printed cards. On behalf of the Executive I am to present Mr. Rankin, who has been our Permanent Secretary for some years, with a small token to carry with him. (Applause.)

In making the presentation of a cigarette case and match box which had been subscribed for by the members of the Executive, the Chairman stated that it was a slight token in recognition of the esteem in which Mr. Rankin, now Lt. Rankin, is held by the members of the Executive, and their appreciation of the valuable work he has done for the irrigation association since the time he became Secretary; at the same time, he expressed the regret they all felt owing to Lt. Rankin severing his connection with the association temporarily. On behalf of the Executive the Chairman wished Lt. Rankin every success in his military career, and the best of good luck and said that he felt sure that before the return of Lt. Rankin we should hear of his earning distinction for himself and his battalion.

MR. RANKIN: Mr. Chairman, Ladies and Gentlemen,—I am sure I cannot properly express what I feel for those kind words and this present and what I feel from my connection with these conventions. I can look back to four or five conventions now, each one of which has been a greater pleasure to me than the preceding one. First, I think of Kelowna where I made some very good friends. Then we moved down to our province, to Lethbridge, and then to Penticton and from there to Bassano, and now we are back into old British Columbia again, as you call it, to the city of Kamloops, and I seem to have covered the ground pretty well and I think it is about time that I was ready to get into some other kind of work. We all have our own ideas and views of this present war and it seems to me that after having waited two years and being strong and able to go, it is up to me to do bigger things. I feel that if I have the good fortune to go to the front that the association will be able to go along without me and when I do come back you may be sure I will associate myself with this body. As you perhaps know, there have been others of this association who have gone to the front. I remember at this time, Mr. W. C. Ricardo, who, when I first joined this association, was one of the first members. Then from this city we have Mr. Arthur Chamberlain. I met him in Victoria. He has enlisted in the country or the Coast as a private and he was feeling very much elated at having been able to enlist. Then, we have Capt. Dufresne, whether he is at the front in France, or in England, I do not know. Then we have Dr. C. W. Dickson. It is quite possible that we irrigationists will meet over there and you may be sure that if we do there will be many pleasant memories called back and we will talk about the meetings we have had here. I have even now in my pocket a little token which was given to me at Kelowna and except for a few dents in the

corners it is sound yet. I will be able to lay this aside now and leave it with my wife when I go away and take with me this later token. It has given me great pleasure to work for this association and when I come back, it will give me as much pleasure as it has in the past.

Three hearty cheers were then given for Lt. Rankin.

WEDNESDAY MORNING SESSION, JULY 26, 1916

CHAIRMAN: This morning we have four good papers and this afternoon we have an invitation to go to Tranquille so we will have to keep very much to our programme in the matter of time. I will first of all call upon Mr. W. T. MacDonald, of the Live Stock Branch, Department of Agriculture, Victoria, B.C., to address you.

MR. MACDONALD: Mr. Chairman, Ladies and Gentlemen,—It is a pleasure to be present at this convention. All yesterday and to-day I have been enjoying myself very much indeed. Just one thing has given me some annoyance. I notice on the walls the statement that the Garden of Eden was an irrigated farm with alfalfa, etc. I do not believe that, because if Adam had an irrigated farm he would not have yielded to temptation. (Laughter.)

A few years ago when irrigated lands were being developed quite rapidly and when a good many new areas were being brought under irrigation, live stock farming seems to have been left out entirely. That was not only true in British Columbia, but in other parts of the country as well. I can remember very well one trip I made through the Yakima valley—the first farm institute trip I was on in that district. It was the most astonishing trip I had made. I could not figure out how there could be permanent agriculture without live stock. I think, perhaps, I said some things that were caused by the particular mood which I happened to be in at the time. Anyway, I made certain predictions expecting that some day they would come true, but they are coming true at an earlier date than I expected. Just three years since I went through the Valley again and I had one of the most interesting trips I was ever on. There were large numbers of farmers engaged in live stock. I remember one man asking me how I expected they could make money on dairy cattle and hogs with land they had paid two thousand dollars per acre for before it was developed. My answer to the question was that if you could make more money by a system of farming by cattle and hogs, than any other way, that it is the kind you should go in for. I am not saying whether you can make money off two thousand dollars an acre land or not. In a good many instances they have come to realize that that is the way they must look upon the situation. Unfortunately, a good many people who promoted irrigated lands have purposely left out live stock because they thought a good many people who might buy their land knew something about the value of live stock, but a great many more people did not know anything about fruit lands and they might believe something about fruits when they put their fictitious values on the lands. To my mind that is the situation.

Now we are getting away from that, and I think it was two years ago that live stock was seriously considered in our irrigation congress and on this occasion it seems

to be playing a very important part. The territory represented by this association is very varied, so far as types of irrigated farming are concerned. We have a very extensive country and have all conditions up to very extensive range conditions. Under irrigation with our favourable climate and soil, we get very large yields, but those large yields which we get under irrigation represent the taking from the soil of large amounts of fertility. Even orchard lands take a large amount of fertility from the soil and an apple orchard in full bearing will take as much out of it as thirty bushels of wheat. This is what Professor Thornber and I arrived at after discussing it for some time. We cannot go on without replacing in the soil some of it. The logical way is to feed some of our crops to our live stock and have it returned in the way of barn yard manure. In that case most of the fertility remains on the farm. Where we are selling butter and cream, practically all remains on the farm. We find in this province that the dairy industry has been recently making very large progress, particularly in the Okanagan valley. It may be of interest to some of you to know that last year in the Kelowna district fourteen silos were erected. A silo is a wonderful thing for that district, and, in fact, in all our irrigated districts, because we can grow so many crops suitable for the making of ensilage. In the Kelowna district corn especially grows remarkably well. There is nothing that is of so great assistance to the production of cheap dairy products as the silo.

Then we have alfalfa. With alfalfa and corn we have a wonderful combination for any live stock and I do not exclude horses. I remember, and Professor Thornber remembers it well no doubt, that the only way we could get people interested in alfalfa was to tell them it was good for horses. It looked as if they were interested in alfalfa. Alfalfa hay is a much richer food than timothy and we cannot feed it as we can timothy. You can fill a horse manger with timothy and the horse will not eat too much of it, but, in the feeding of alfalfa, we cannot feed him as carelessly as we can with timothy. Then, with alfalfa hay, we are feeding something out of balance, so far as nutritive content is concerned. We are feeding more protein than is necessary and we should balance the food we give to the horse. There is no reason for believing that timothy hay and oats are the only feed for horses. I have fed horses on alfalfa and other grains side by side with horses getting timothy and oats and have worked them just as hard and got equally as good or better results where I was feeding alfalfa hay.

Where live stock is being introduced on the irrigated farms, it is important that good live stock be secured. As I have mentioned, dairy cattle are very popular in our irrigated belts, but there are a lot of poor dairy cows yet, and the more we get of them the worse off we will be. The good dairy cow is a faithful friend that will give good returns for the care she receives. In laying any plans involving some new phase in our system of agriculture, we should look well to the future. We are too much given to be swayed by temporary conditions and every wind that blows. Sometimes we find that certain animal products are high. At the present time sheep and mutton are high in price and naturally everybody is interested in going into sheep. A few years ago, up until this year, we were doing a little more to encourage sheep production than we are doing this year, because we realize that it is a very difficult matter to get breeding stock and we also realize that people buying now are buying on a high market and unless very great care is exercised, they will meet with poor results, especially if the market for sheep declines and evidently

it will. We find that prices fluctuate, but for some years I do not think we will see such low prices as we have seen up to the present time.

In my work, we meet with many advisers. They come to us and tell us what we ought to do. One man was recently telling us some unpleasant things about the sheep industry. He said, "Why don't you get these people to bring in a lot of sheep?" I said, "I would like to do that, but where would we get them?" "Why didn't you start and talk this a few years ago?" he replied. As a matter of fact we did. We were doing it through the Provincial and Federal Governments but this man continued, "If I had been in your place I would have had more sheep in this province." I said, "About that time if you were in my place you would be wondering about the profits you could make in guinea pigs." That just about illustrates to you my idea. It is very interesting to have these people tell us what they would have done under the circumstances.

At the present time or just recently we have been trying to encourage the raising of horses and that has not been a popular move, although within the last month or so, many are beginning to realize that some of our predictions are coming true. There is every evidence to believe this now. As Dr. Rutherford pointed out to us yesterday, there is a very good market for horses. The kind to raise is the horse of size and quality, as the smaller horses are never going to command a high price. At the present time there is a demand for lighter horses that we have never seen before and I hope we shall never see again, because of the war. Look at the price on the boards to-day. Good work horses, farm horses, can be sold readily for three hundred dollars, some for more and our light horses, suitable for cavalry purposes, are far from reaching that price, even though we have at the present time such a demand for that type of horse. The same is true of the heavier farm horses. It is the horse that has been commanding the price. I know that in the Kamloops district there are a lot of people who have been buying up young horses looking to an early rise in price which will bring a handsome profit.

There is one thing that this exhibit here brought to my mind, and that is the possibility of raising alfalfa and other seeds. To encourage the production of alfalfa seed in the Okanagan, Thompson and Kamloops valleys, and probably other districts, the Department of Agriculture has purchased a clover hulling outfit which will be sent to different districts where alfalfa and clover is being raised for seed. A nominal charge will be made for threshing. Our reason for doing this was the great opportunity afforded on one hand and the great difficulty we have on the other hand in finding good clover seed free from weeds, and we know that we have enough noxious weeds in this province at the present time. I think we have nearly all that has been invented so far to-day, but we do not want to get any larger proportions than we have now. This is because we have large areas well adapted for the production of seed, so that we will be able to get not only more seed, for those areas, but a better quality of seed.

I should have mentioned in speaking about silos, a scheme that has been in operation for some time. We undertake to build the first silo and fill it in each community and that plan has resulted in doubling the number of silos in the province in 1915. During 1916 we expect to see a much larger number of silos than were built in 1915.

I have been glad of the opportunity of coming to the Kamloops district on this occasion. The Kamloops district is a district of interest to a live stock man and for the benefit of our visitors, I want to mention that on the 1st July, I attended a live stock show about six miles over the hills, and I want to say that that show was better than any other show in the province outside of Vancouver, New Westminster and Victoria. I say that without fear of contradiction and I have visited them all and the Nuxford show is the best with the exception of the three larger shows, although that show has only been held for three years. (Applause.)

The Kamloops district has been and always will be an important live stock centre. In some parts of the province where the range has been broken up into smaller farms, live stock to some extent has disappeared. Unfortunately, the prosperity of those districts has disappeared, but will return with the return of live stock. You will probably think that we live stock people are egotistical, but it is only a few years ago when we were almost ashamed to be in the live stock industry, but we are now having our innings and we have come back and this time we have come back to stay. Wherever live stock gains a foothold, there you will find prosperity and there can be no permanent system of agriculture which does not include live stock. In history there has not been such a system and we can only judge the future by the past. From every angle we look at it, it is the logical thing. In the Yakima valley I made the statement that some day the Yakima valley would be as famous for its live stock as its fruit and when that time came they would be raising more live stock than fruit. I think the Yakima valley is now bearing out that prediction as it has now become famous for its live stock district and that has not in any way interfered with its claim to being a fruit growing district.

I have used up the time allotted to me on the programme and after the address you listened to yesterday on the same subject given by Dr. Rutherford, I feel hopelessly lost in any endeavour I might make to follow the pace he has set and I do not think you expect it of me. I just wish to say to the people here and in British Columbia, that we are going to see a considerable development along live stock lines and I want you to feel free to call upon me for any assistance I can give you in helping the live stock industry in the banner province of the Dominion. (Applause.)

CHAIRMAN: I think that any one who is interested in live stock must be pleased to have such an ardent expression of belief in the live stock industry. We have heard so much about fruit growing for so many years past in this district that we began to think there was not so much to be made out of live stock as out of fruit; but, as Mr. MacDonald has said, we are coming back to the time when live stock is coming into its own again.

MR. JOHNSTONE: Mr. Chairman,—This is a subject close to what I am doing at the present time. I am a fruit grower and fruit growing has been my hobby. I have always kept more live stock than any one thought it good policy to do. When I started in first my neighbours were buying all sorts of chemical fertilizers. I bought more hay and stock. At the present time I have thirty acres under small fruit and keep generally, fourteen or fifteen head of young stock and a number of cows and also some sheep. I expect to have more sheep when I can afford to keep them. I have also twenty-five or thirty hogs and I have always found in cases where they have

rooted up my trees that I could put the tree in again and it would grow up and bear in two years. I have found, however, that sheep are better than hogs. One reason I brought the cherry branches to this convention was to show what can be done with live stock. I think fruit growers will grant this, that it is a bad year in British Columbia for cherries except in certain districts. However, you can judge for yourselves as to whether I had a poor crop. These are all from my own orchard where I pasture my sheep all year. I agree with everything Mr. MacDonald has said about live stock. I have not bought any chemical fertilizer since I have been in the business. (Applause.)

MR. WOODWARD: Mr. MacDonald mentioned the fact that alfalfa was an unbalanced ration for horses. I would ask his opinion with regard to dairy cows. Is it so good?

MR. MACDONALD: Dairy cattle require a different proportion, particularly dairy cows that are milking. They require a good nutritive in a different proportion to that required by a horse. In a horse we are producing energy. In dairy cows apart from maintaining the body, we are producing milk and we, therefore, require different nutritives for energy than we do for milk and alfalfa is the finest thing we can get for dairy cows, the best and cheapest.

MR. THORNBER: I want to impress upon you folks what we are doing in Washington in connection with dairy work in conjunction with fruit work. I had to work side by side with Mr. MacDonald at one time and maintain that fruit growing was the only thing to do. We are, however, reducing our fruit work. We are producing better fruit and more fruit than we were producing on the entire acreage. One of the serious problems we had to meet was succulent food for the cattle. We are doing this and producing some 6 to 7 tons of carrots an acre. It shows the possibility of the small fruit grower on a limited area. We are cultivating alfalfa in the same way as we do other crops. We do not use it for ensilage. We use corn and other fodder for ensilage. I am particularly glad that the fruit growers are not losing their heads, but are gradually taking up and modifying another branch of agriculture which will result in better returns.

You know the price of hogs last year and what it was a few years ago and the price of horses twenty years ago. You also know the rush that so many have made to change and expect immediate results from some popular produce of the farm. Do not go to work and pull up all your fruit trees and go into grain, horses or hogs, but simply modify the problem as it is. Two weeks ago I had the pleasure of spending some time in Ontario and visited the big fruit farms in Hamilton and Winona. I was particularly interested in this. I said to the fruit growers, "You can go ahead and produce the fruit that will make the pies and the sauce, but," I said, "the fruit growers of the North-West"—and I meant Washington and British Columbia—"will send in the fancy fruit while you are working off your heads for the pies and sauce." They saw the point and took the problem in the same light. Poultry is receiving its share also. We have a great many large poultry farms in the North-West and they are doing well in conjunction with small orchard work and small fruit generally.

MR. MACDONALD: There is just one thing that I want to bring to your attention in order to consider it, not that I am able to say yet whether it is right or wrong. We were talking yesterday of the lack of reliable live stock statistics. In Australia, the owners are compelled by law to fill in a form which they mail to the Department of Agriculture or the Statistician's Office giving the numbers of live stock they have on their farms. I want you to consider the question of whether or not you think it would be well to have a law providing for such statistics and if you feel, after consideration, that it would be a good thing to follow out some such plan as worked out in Australia, I would be glad to take steps to see that we have such an Act passed in British Columbia. (Applause.)

Row of Six-year-old Poplars, from Seed (Irrigated)
Home Ranch, Fruitlands, B.C.

MR. WOODWARD: I would suggest that before the convention closes a motion to that effect be put before it to get an opinion of the members here. I think the suggestion a good one.

CHAIRMAN: If you will write your resolution out and get some one to second it and hand it to Mr. Peters, Chairman of the Resolution Committee, we can later put it to the meeting.

I think the time is up for that discussion unless there is something that any lady or gentleman may wish to say. There are a few things our Secretary wishes to make known and amongst them is the list of members who were present at the first meeting held in Kamloops in 1910. I would like the members whose names are read out to come to the platform and take their seats here.

MR. RANKIN: It is always interesting to look upon past conventions and follow those men whom we might call ardents in this cause. In the list I have taken

from our 1910 report there are several names of members who are here to-day. I would like to read the names of those I have here and if there are some whose names I do not read I wish they would come to the platform. Senator Bostock, E. M. Carruthers, A. S. Dawson, W. H. Fairfield, Fred J. Fulton, E. B. Knight, C. E. Lawrence, A. E. Meighen, J. T. Robinson, John F. Smith, E. C. Thrupp, James White, R. M. Winslow.

The following members then took seats on the platform:

SENATOR BOSTOCK, Ducks, B.C.
E. M. CARRUTHERS, Kelowna, B.C.
A. S. DAWSON, Calgary, Alta.
W. H. FAIRFIELD, Lethbridge, Alta.
C. E. LAWRENCE, Kamloops, B.C.
JOHN F. SMITH, Kamloops, B.C.
E. C. THRUPP, Kamloops, B.C.
JAMES WHITE, Ottawa, Ont.
R. M. WINSLOW, Victoria, B.C.

CHAIRMAN: I will now call upon Mr. Auld to address the meeting.

MR. AULD: Mr. Chairman, Ladies and Gentlemen,—I have lived for a good many years in Saskatchewan and always felt quite satisfied with our sunlight. But, this morning we have had a very remarkable surprise here in that I, along with the other gentlemen from Saskatchewan and Alberta, have been given a distinguished place in the sun.

I am very glad indeed to be at this convention this morning. I am sorry that my Minister, Mr. Motherwell, could not be here at this time. He has just finished a five weeks' tour with a better farming train which is making a tour of Saskatchewan and he felt that he could not afford to be away from his office any longer.

Irrigation in Saskatchewan does not hold the place that it does in Alberta and British Columbia. That, perhaps, is our misfortune. We had a very distinct misfortune in 1914, when, you remember, a large part of our province failed to produce a crop. We are glad to say we made up for that in crop last year when our province, I think, produced half the wheat crop of Canada, besides a large crop of oats and other cereals. However, we realize the importance of irrigation in any system of agriculture.

We are very glad to know that so many of the irrigators from Saskatchewan are here to-day. Down in the Cypress hills' region in the south-western portion of our province we have a large number of systems, none of them, however, comparable to the gigantic system of the Canadian Pacific Railway and other projects in the province to the west of us. The systems in Saskatchewan do, however, play an important part in the province and we look to a further development of them. What impresses us most in irrigation in our province is not the assurance which it affords of a crop, but the opportunity which it gives, to those fortunate enough to have the water, of growing a larger quantity and larger variety of fodder crops in order that they may engage in live stock farming. On a great many of the farms in Saskatchewan, grain growing is the predominant industry. It is only when live stock comes in and occupies a relative place with grain growing that the best agricul-

ture can be practised. We find in the older districts where live stock has not been introduced, such problems as noxious weeds, drifting soils and other things have been coming to the fore. After experimenting many years with noxious weeds on the prairies there is only one conclusion to arrive at and the only way to successfully combat the noxious weed problem is by having sufficient live stock and by varying our operations so as to grow more grasses and to diversify our farming operations. There has been a very marked tendency towards live stock farming in those districts in Saskatchewan where the natural conditions favour it. Running diagonally across our province from south-east to north-west and in the northern portion of the province we have a large area of prairie country and open spaces, abundantly supplied with natural pasturage and grasses, and in those districts live stock and dairying has made definite progress. The dairy industry while not on such an extensive scale as in the other provinces—in Alberta, for instance—is on a very satisfactory footing and in British Columbia we find a considerable market for our surplus products.

I do not think it was intended that I should occupy very much time this morning and I will only give a general view of the agricultural conditions as we have them in Saskatchewan. I bring you the very best greetings from the province of Saskatchewan and the regrets of my Minister, Mr. Motherwell, that he is not able to be with you and my best feelings that his absence made it possible for me to spend a few days in your delightful city and province. (Applause.)

MR. RANKIN: (Reads very interesting war bulletins to the convention.)

MR. LAWRENCE: The cars will leave from the Leland Hotel at 1.30 this afternoon for the trip to Tranquille. Owners of motor cars in this city and district have kindly placed their automobiles at the disposal of the convention and will provide transportation for the excursion thereby. (Applause.)

CHAIRMAN: I will now call upon Mr. F. H. Peters, Commissioner of Irrigation, Department of the Interior, Calgary, who is to address the convention on "Irrigation Districts' Acts." (Applause.)

MR. PETERS: Mr. Chairman, Ladies and Gentlemen,—This paper of mine is really not entitled "Irrigation Districts' Acts," but simply "Irrigation Districts," because in the paper I have not dealt except very briefly with the actual Acts.

Irrigation development in America has had its great boom—has had the great depression which always follows a boom, and we are now, I believe, rising again to the time of the more stable and economic establishment of irrigation.

I have chosen this subject because the passage of Irrigation District Bills in 1914 and 1915 in British Columbia and Alberta, respectively, seems to indicate the rise of newer and better conditions for irrigation.

I am sorry, Mr. Chairman, that an unavoidable lack of time has made it impossible for me to deal with the subject as fully as I think it deserves. I feel that this paper is not as complete as it should be, and, therefore, I trust that you will accept what I have to say merely as some observations which have not been very well worked out. One point I wish very distinctly understood, and that is that while I compare district development with company development, and while I indicate

that district development is an easier and more proper form of development, yet, I do not want to be understood as in any way criticising past company development, or any present company development.

It seems that perhaps times are changing from the old days when every effort was put forth to develop new agricultural areas, and that now the tendency is rather to improve old ones. I remember once at an agricultural meeting not so long ago, hearing the Minister of Agriculture for Alberta drive home his idea by stating that the problem we were facing was not to get more people on the land, but to keep those on the land who were there now.

I do not know whether conditions are exactly parallel in British Columbia, but in Alberta our first condition was that of having much vacant land which required settlement, and it seemed at the time that this land could be more easily settled if the farmer were provided with irrigation water. The early projects of this kind were obviously those for company development, because it required a company to raise the necessary capital to put the water on the land, and then create the organization to induce settlement. Now we have the very different condition of settled districts where the farmers have become established upon the dry, or perhaps partly irrigated land, and they want to get a good water right, so that by irrigation they can increase their prosperity over and above that possible under dry farming conditions.

I make no criticism, as I stated before, of company irrigation development, but looking to the time when our irrigation districts will want capital, and feeling that capital may, perhaps, be scared off by previous company difficulties and failures, I want to bring out some of the points to show how much easier is a sound development under the irrigation district plan than under a company plan, and how much safer investment, therefore, is in the enterprise.

Where conditions are healthy for irrigation district development the bulk of the land should be settled, and thus we are able to contemplate at once an irrigation district where that great force that never blunders—"natural selection"—has already hand picked the settlers. Or in other words, if you have a "bunch" of people in a semi-arid district that will "make it stick" under dry farming, there is no question but that they will flourish if you give them an irrigation ditch.

The essential basis of all irrigation district acts is well set forth in Dr. Fortier's letter published in a Report on a Public Irrigation Corporation Bill published by the British Columbia Government, 1914, as follows:

"The main purpose of district laws is to place in the hands of those who own land and use the water the management and control of the irrigation system, and to provide a method for securing funds to construct and operate works that are too costly for the individual or small groups of individuals to undertake. The district law provides a means of securing a water-supply independently of private corporations, whose officers and water-users seldom work in harmony, by selling bonds to obtain funds to construct new works or purchase existing works.

"Perhaps the chief benefit of the district law is to unite in one organization all the people of an agricultural community in such a way that each contributes his just share towards the expense of the undertaking, has a voice in its management, and a share in its benefits. These laws oblige those who profit by such undertakings to contribute something to defray their cost."

The strong features of the irrigation district are brought out in the quotation above, but I would enlarge upon them a little so that they will be clearly fixed in mind. All large irrigation developments have found that the greatest and most difficult problem to deal with is the human problem and this is undoubtedly easier to meet and deal with under the irrigation district idea than any other. Let me run over some of these problems as they are always found to exist, contrasting the conditions under company development and irrigation district development.

You see the success of an irrigation project depends first, last and all the time on the settlers. It is very different from a big industrial development where the certain class of labour required is always available to do a certain work for a certain wage, and where success depends primarily on efficient and wise management. In a case like this the management can control the worker, because they say "either do the work as we say, and for the wages we offer, or get out and we will hire another man who will." The farmer is a very different man—he is his own master and while the management can advise him they cannot force him, and they are absolutely dependent upon his making money in order that they can get their money out of him. So I say again—willy-nilly—the success of the irrigation project depends entirely on the success of the farmer, who cannot be driven like a wage earner and is very largely his own boss unto himself.

Now let me point out again how much more assured the irrigation district is of getting successful farmers than the irrigation company.

All the reasons I am going to give are so much interwoven that it is hard to separate them, but I have to do this to try and bring them all out.

Generally the company selects a tract of unsettled land which they buy up and propose to improve by the construction of irrigation works and then sell again to settlers. And just think what a lot of responsibilities they have to shoulder. They have to estimate on a myriad of features all of which might be included under the head of feasibility if you give this word a very wide meaning. But we will start from the top, or the bottom, whichever it may be, and catalogue some of the questions.

The company gets reports on the climate, the topography, the soil, the general surroundings, the crops that can be raised, the prices that they will fetch, etc., etc., etc. Now they propose to bring in settlers from probably all over the world to settle on the tract. I have no doubt that the man who comes up, perhaps from Nevada, thinks, after reading the prospectus or meeting the agent, that he will like the climate and surroundings in British Columbia or Alberta, but the prospectus and the agent very often paint conditions in a very rosy hue on the one hand, and on the other hand, far fields always look green. So the man or his wife when he gets here may find that he does not like the climate—Who is to blame?—the company—and the most deadly seed of dissatisfaction is sown.

The company considers the cost of preparing and working the land, the crops that can be raised, and the price they fetch, and then boils these down in some palatable financial summary. They set the price of the land and the annual water rental against this, and the difference is the potential prosperity of the settler. But, mark you, this is in the prospectus. No doubt the company's engineers or agriculturists are sincere in their estimates, and perhaps the figures have been approved by equally sincere government men, but all the same, these men may not be practical farmers,

they may not have sufficient information, or they may be somewhat biased in their desire to see the project and the district as a whole get settled up and go ahead. So the settler after a few years work may find it costs more to prepare and work the land than was estimated, the crops may not produce as expected, and worst of all the prices may go down. Who is to blame? Can you guess?—the company—and the most deadly seed of dissatisfaction has taken root over the whole project.

Now I have not exaggerated very much in saying these things, and it is very obvious how they are all done away with in the irrigation district.

In the irrigation district the land is mostly all settled, and the fellow who does not like the country has already moved on to sunnier climes. The settlers already on the land know what it is like; know what crops can be raised; know what prices are, and probably know from other irrigation developments in the vicinity what the irrigation water will produce. Now this man has a very good idea when voting day comes whether it is going to be a good thing to pay the price for the water, or whether it is not, and he is not so liable to err as the engineer, who has to estimate on everything. And, if later on the settler does find out he has miscalculated a bit and things are not as rosy as he thought they would be, who is to blame? Himself—not the company, and what a difference this makes. This man will say to himself, "well, it's my own fault," and he'll buckle down to make the best of a bad job, and probably find out in another year or so that things are not so bad as he thought. The other, the company man, no matter how good a fellow he is, is liable to spoil his disposition and his work by always saying, "this is the company's fault."

Now let us go on to the operation end of it. All the engineers I know who are operating company canals vary in degree from being entirely grey to having grey hairs showing up behind their ears, and all the farmers I know who have been under their canals say that they are paid by the company to always give the farmers water just when they don't want it.

I know water masters elected by irrigation districts who, while they have a very wide and strong vocabulary are still young men, and the farmers tell me, "Well, he don't always give us water when we want it, but I guess he does the best he can."

Now I have tried to explain to you in this sketchy way what a big factor the human element is, and how much better it is worked out under the irrigation district than under a company project, which I have taken as representing all other forms of development, including government projects which I hesitate to mention at all in this paper, because they have even greater difficulties than the company projects.

Now, to finally drive this home, I will quote again in part from Dr. Fortier:

"The main purpose of district laws is to place in the hands of those who own land and use the water the management and control of the irrigation system. . . . . The district law provides a means of securing a water supply independently of private corporations, whose officers and water users seldom work in harmony."

I started out saying that I would try and bring out some points indicating the advantages of the irrigation district, but I have really only dealt with the greatest point, the "human element"; and it seems to me that this point is worthy of the fullest consideration. It is unfortunate but true that whenever we want to start any big enterprise we have to go to the banker, and the banker won't lend his money

until he is satisfied on every score. I hope that in the future bankers will be sufficiently interested in irrigation to become posted on its development, and when they do this I believe that the question of the human element will loom large with them. I feel sure that in the future, the well posted banker, after he has received every assurance concerning the security of the water supply, the adequacy of the works, and all these things, is going to say, "Your explanation is not complete. You have shown me that you have the water and the works to conduct the water to the land, and you have shown me that you have the right kind of land and the right kind of climate, but, in between these two stands the settler—neither the water or the land is any good without a good settler. Now show me where you are going to get the right kind of settlers to put on this project." It seems to me that if we can take this banker or his agent out and show him the bulk of our settlers already on the land, why then, the last doubts must vanish from his mind and capital will be forthcoming.

After making the, perhaps very strong, statements that I have about irrigation districts, I think that to play safe I should answer the question which some one will surely ask me, "How is it that so many irrigation districts have proved to be failures in America?" My answer is that I have been talking about districts formed under good irrigation districts' Acts, and practically every failure in America of a district has been due to their formation under a bad irrigation district Act. And I would say here, that the British Columbia Act (The Public Irrigation Corporation Act) while it may have its detractions, is in my opinion a good Act, and provides as fully as possible against the faults and errors that have developed in other places.

California is the leading State of the Union for irrigation districts, and has had probably the most disastrous failures in irrigation districts, but always the fault of a bad Act, and speculative development. The Wright Irrigation District Law was passed in California in 1887, and was undoubtedly a bad Act, which is not surprising as California was seething with speculation in those days, and the only precedents available were the Utah Acts of 1865 and 1884, which could hardly be classed as good Acts. Under the Wright Act, 49 districts were organized, and only 8 of these are now operating. But against this California amended its Act in 1897 and again in 1909, and since the first amendment no irrigation district organized has defaulted in the payment of either principal or interest of any bonded indebtedness. It is true that these only comprise 9 in number and these are not all operating, but they are all understood to have a successful outlook.

The data I have quoted regarding California is from Bulletin No. 2, "Irrigation Districts in California," by Frank Adams. This bulletin I think makes very clear the distinction I have drawn between good and bad Acts, and may be obtained from the U.S. Department of Agriculture, or the California State Department of Engineering.

There are a number of specially important points which should be looked after so that the welfare of the irrigation district be properly protected. These I would catalogue as follows:

1. The adequacy of the water supply must be ensured.

2. The plans must be complete, and properly approved, so that it is definitely known what land is to be irrigated, and how.

3. The estimate of the cost of the works must be complete and properly approved, so that the financial conditions are not misrepresented.

4. The right and value of the vote must be so fixed that the majority will represent the established substantial interests in the district.

5. The sale of the bonds or debentures should be carefully supervised.

6. The proper expenditure of moneys raised should be carefully supervised.

The careful treatment that has been given in the British Columbia Irrigation Bill indicates that the first four points, viz., water supply, plans, estimate of cost and the right of vote are amply safeguarded.

Home Ranch (Irrigated), Fruitlands, B.C.

It seems to be the opinion of men in the United States who are particularly well qualified to speak on this subject, that a minimum price should be fixed at which the bonds or debentures can be disposed of. This is so because when the cost price has been ascertained, and debentures are voted on, the voters naturally assume that the debentures will realize their face value, or some other price which may have been estimated; and if the sale price is materially lowered, then the relative cost price is just added to the same extent, and where the difference is very material it may add a considerable debt on the district, without the voters realizing what they are doing. However, the answer to this is that no other corporation is limited as to the selling price of debentures, and that if this is done with the irrigation corporations, it might seriously hamper them in their financial dealings.

Experience in Colorado has proved that all the provisions which were enacted there in this respect could be "beaten" in some way or another if the men in charge of affairs wanted to do it, and so no doubt it is wise to leave this to the Trustees and rely upon their business ability and honesty.

Experience in the United States also seems to indicate that a close supervision of the expenditures of the moneys raised, particularly on the large construction work, is very desirable and the tendency is to make this the duty of the State Engineer, whose position is most nearly like that of your Comptroller. The efficacy of this plan depends entirely upon the ability and activeness of one state or provincial official and, in my opinion, the responsibilities in this respect are very properly placed by your irrigation bill on the Trustees and the Board.

To sum up these features, and as has been pointed out by Mr. Grunsky, all the questions that arise resemble very closely those arising in a city or municipality, and the procedure of dealing with these questions in very much the same manner as in cities and municipalities, the practicability of which has been well tested by time, seems a very wise provision.

The Irrigation Districts' Act of Alberta is not, in the speaker's opinion, so complete an Act as the British Columbia Act, or perhaps as is desirable. The fact, however, that the authorization for construction and the water license must be obtained in accordance with the provisions of the Dominion Irrigation Act ensures the adequacy of the water supply and the completeness of the plans. The Alberta Act stipulates that the loan raised to construct and complete the proposed works shall not exceed $25.00 per irrigable acre, and that the amount required to be raised annually for maintenance and operation shall not exceed $1.50 per irrigable acre. It seems to be clear that this feature must be carefully scrutinized by the Dominion officials before authorization for construction is granted, and so further assurance in respect to the estimate of cost and financial conditions, over and above the responsibilities of the Trustees, is gained by the subjection in this respect to the Dominion Irrigation Act. As regards the right and value of the vote, the sale of bonds, and the proper expenditure of money, the same remarks that have been made concerning the British Columbia Act are applicable.

Now, ladies and gentlemen, in conclusion, admitting the scarcity of capital which we must expect for perhaps the next decade, I believe that the outlook for irrigation district development is great. Development upon the district basis should be sound enterprise. We have good district laws, and if capital can only be interested sufficiently to cause it to examine the conditions, I feel sure that it will recognize the excellent security offered by the irrigation district lands, and be prepared to loan the necessary money. (Applause.)

CHAIRMAN: On our programme we have not allowed any time for discussion, but the paper of Mr. Peters is so interesting and he has placed the matter so clearly before us that if any person wishes to discuss this paper I think we are entitled to take a few minutes in doing so.

MR. WOODWARD: Mr. Peters in speaking of California has stated that a great many of the associations down there have failed. I have collected considerable information on irrigation associations in California. I find there have been some two hundred projects which have been drawing water from wells from 100 to 250 feet deep. Was it these companies that failed or was it the ditch companies? The cost of irrigating land from deep wells averages $15 an acre; for the shallow wells it averages $5 to $10; that is for an acre of land for the season. Of course,

California being a warmer climate the soil naturally requires considerable water. These being high prices, would it not be these companies that failed? I would like to compare notes with Mr. Peters in this respect.

MR. PETERS: I am really not fully posted upon conditions in California, but I am pretty sure that the companies I speak of as failures, were not well companies. They were diverting water from creeks. As I pointed out in my paper it was not through good district laws that these companies failed, but because there was a perfect orgie of speculative enterprise and if you read the history of these schemes they are ridiculous. Those that failed were really stupid schemes and were bound to bring about trouble. I do not think any of the companies though were bringing water from wells.

MR. WOODWARD: Is it possible then to irrigate from wells? If these wells had failed it would not be profitable irrigation. I have gone into the question of irrigation with wells and I have gathered considerable data from the United States. In Garden City, Kansas, the United States Government started fifteen years ago a reclamation project. The company took their water from the Kansas river and they have some 280 wells in that locality. Their wells are arranged in twenty-eight groups. They are driven by electric power derived from a central plant. At each of those groups is a pumping station. The ditches radiate a distance of two and one-half miles so that each station is five miles from the other. Under this system there was a short time ago, ten thousand acres under irrigation. The cost to the farmer is three dollars per acre for the year. According to the government scheme, after a term of years this three dollars an acre is supposed to pay for the plant and then the plant becomes the property of the land-owners. To go further south, to the States of Louisiana and Texas, including rice irrigation, there were 750,000 acres of land under irrigation. Now it has been maintained that water from wells is not so suitable for irrigation as it is too cold. I do not altogether uphold that. I think that after water is pumped from a well and run about one hundred yards on the surface it is plenty warm enough to raise crops. But, these people in the south use a great deal of water from the wells in preference to the water from creeks so that we may say, I think, that well water is suitable for irrigation. In New Mexico, I have not the amount of land under irrigation, but there is a great deal. At that place they cannot obtain electricity. They use gasoline engines. Of course, gasoline is an expensive fuel and oil fuel only runs about one-third the cost of gasoline. In wells that average from 50 to 100 feet deep, the usual cost is from three to four dollars per acre-foot of water. If they were to use crude oil, I think, and change their system they could do it for less. Gasoline according to our prices here is 34 cents a gallon. At the present time crude oil or heavy oil is only 14 cents; last year it was 9½ cents. In comparing the two as to power, there is more power in one gallon of heavy oil than there is in one gallon of gasoline as power is not derived from bulk, but from the weight per gallon. There are large tracts in Nevada and Colorado from which I have not had any information, but I was thinking that here in British Columbia there are large tracts of land where water cannot be obtained from creeks. Now, if sufficient underflow could be obtained to sink wells, why is it not profitable to sink wells in British Columbia or Alberta. I think that from the data I have

received it is well worth looking into and I would like to see this question taken up and gone into by the convention and also taken up by the Government. In New Mexico the estimated cost for watering 200 acres of land is $2,000. On small tracts of land up to 40 acres, the estimate is given at $25 per acre. Comparing the two you will see that the large plant is much cheaper. It works out at practically $10 an acre for installing your plant, while the small one is $25. I am sorry I have not any more definite information upon the subject, but if it has been of any benefit to the association or any one here, I am pleased to have given it. (Applause.)

MR. CRANDALL: I have listened with considerable interest to my friend with reference to pumping and other systems of irrigation in California and the failure of the large number of projects in that state. I have had the pleasure of living in California for something like twenty-five years and being interested all of that time in irrigation, and I have, therefore, some knowledge of irrigation conditions in California. In speaking of the failure of irrigation projects in that state, I may say that in the main they were very small ones, practically neighbourhood projects and the failure of them was caused by a very defective law which was placed upon the statute books and is known as the Riparian Rights Bill. Those laws were such that people below who had rights were given a relative position from the head waters of the ditch. In other words, if I occupied the fourth place on the ditch for taking out water, I could not take out water until my neighbour above had been served. For that reason very many of the projects got into difficulties and were failures.

With reference to pumping from wells. I am sorry I cannot go into the exact cost of using heavy oil, gasoline or electricity for pumping water and I presume the convention is not very much interested in that, but I may say that the pumping of water from wells in the valleys of California are usually projects in which not more than one person is interested. Most of the people in California handle water that way and are irrigating for themselves and using it only for their individual use. What they can sell they do so to their neighbour. I have done something of that kind, in fact, where the water was sold like that. With reference to the cost of pumping water in California, it has varied considerably. At first we used steam and coal power, then when the great oil boom of California came on, we made big contracts with the Standard Oil Company to lay down oil at 71½ cents a barrel of 42 gallons. We found that the pumping of water then was only a small expense and we could put the water on our orchard very easily. Do not think that, because a few projects failed in California it was any reason that irrigation was not appreciated very much. It was just the petty squabbles that we got into there, and we are getting out of them in Alberta and British Columbia. We are now making it possible in Alberta and British Columbia for every man who goes in for irrigation to receive absolute justice.

MR. CARRUTHERS: I should like to ask a question as one personally concerned. I have been mixed up in a company service and have had to take all the company's kicks. I believe in water municipalities. Mr. Peters said in his address that the settlers should form themselves into district municipalities or water districts and they would have less trouble amongst themselves. I think you must be referring more to Alberta than British Columbia. The point I make is this that in British Columbia

where we want water, we want it very badly and until water is to be had there will be no settlers. One company I represented for a number of years had seven thousand acres and two settlers on that tract. I was one. There was no water and a grasshopper could not live on the land. Until water was put on it you could not form a municipality. The same thing applies to the company I now represent. They have ten thousand acres and until settlers come on you can not form a water district. If no one is there to put water on it the land goes back to the company or the Government, neither of which you approve.

MR. PETERS: There is only one answer to that. Where you have absolute aridity and cannot get the settlers there until the water is there—then in that case you cannot do anything until a company does develop it. I was speaking of Alberta, because I know something of it. There is really none of that country, however, that you could say was absolutely arid. In practically all of the country a man can get a foothold without irrigation. I discussed this question with Mr. Fairfield coming up and I know that there are places in British Columbia where you have to have water and I think then that company development is the proper way, because I do not believe the Government will undertake it for many years. I do not take issue with Mr. Carruthers on that point. If you have the arid land, you must have water. I do not know anything about the conditions here, but I believe in irrigation so much that if you have arid land and there is always a hot sun along with it—provided there are no gross blunders made such as putting in a system where there is no water—I cannot see why the project should fail, because it seems to me that once the settlers get on they will make good on it.

MR. THRUPP: You cannot satisfy a banker unless there is some settler there producing something, but if a company takes up a district and provides irrigation they should at once set to work and irrigate the land themselves. The mistake made by companies here in this country is that having provided the works they left the lands unirrigated waiting for settlers to come in. The solution is to put the lands under irrigation and get fodder crops growing and get something produced and pay interest on their working expenses until settlers do come and if they do that they will get their settlers instead of having the land standing idle. Mr. Peters mentioned that in Alberta they proposed to limit the amount of money that should be spent upon irrigation schemes to $25 per acre. That figure might be suitable for Alberta, but in British Columbia we should want a figure of over $60 an acre permitted on some lands we have to irrigate. There is another point. With regard to irrigation districts, I agree with what Mr. Peters has stated. There is one point not dwelt on and it was brought up by Mr. Tedder's paper last night. Mr. Tedder told you that the city of Kamloops was ready to supply power to pump water on to the lands. But there is the financial difficulty. The municipality which undertakes to supply power has to find funds upon the security of town lots. It is an anomoly that capital should be provided from town lots to provide power for outside land. There are about forty people on the North Thompson who want electric power from the city and we cannot get it because the city is not in a position to borrow money and at the present time there is no legal provision that I know of that would allow the district to form a municipality and borrow money on the North Thompson. If some

provision were made for that there would be a better chance of seeing more power used than under present conditions. The capital for irrigation purposes should be raised upon the security of the land to be irrigated. If we do that, it would be quite possible for groups of people outside of the city to raise money to provide for the branch electric mains, transformer stations and distribution works. It would be a real step in having electrical power taken and used by those outside of the city in connection with their irrigated tracts. That is a matter which might well receive some attention from the Government. (Applause.)

MR. DAWSON: I am one of those unfortunate individuals that Mr. Peters refers to as having grey hairs before their time. A short time ago I was asked by a man putting in a field of alfalfa as to how much water he should use and I told him I could no more tell him that than the size of the shoes he should wear when he was twenty-one.

I have listened with interest to Mr. Peters' valuable paper and there is no question but that small schemes could be successfully developed along the lines of community development, but it is an acknowledged fact that the large projects can only be handled by either corporations or governments. The necessary machinery to successfully colonize, settle and develop large tracts can only be carried out along those lines as has been done in Australia by the Government and in Canada by the rapid transportation companies. The ultimate aim of those large corporations is, however, that after having colonized the lands and settled them with the proper men and put in the necessary machinery for operation, then the water users' associations will be formed and the operation turned over to the settlers, but that cannot be done in the initial stages. In the case of the Canadian Pacific Railway contracts, the contracts call for the formation of those district associations at such time as a certain proportion of the land is sold and there is no question but that it is the only way that the larger projects can be developed. Until the settlers are on the land in large numbers those projects can only be operated by the corporations or governments who constructed them. But as the lands are taken up and the proper class of people placed on them, the water users' associations can then be formed and fostered by the companies with every success. (Applause.)

MR. WOLLASTON: One thing we lack in British Columbia is a maximum, as they have on the prairie. If we had a limit set of $25 or $30 an acre, I would not like to go there. There would be more cattle if that were the case. I know lands under irrigation that would cost $1,000 to irrigate for all the irrigation that is on them and they are going back to cattle ranches. If the land cannot be irrigated economically then it should not be irrigated. It looks as if some land could not be irrigated without governmental aid.

MR. LAWRENCE: The Chairman of the Local Board reminds me that last week we made an investigation of pumping plants and that should be placed before the convention. We think it is one way to solve the problem of irrigating the bottom lands.

CHAIRMAN: I have no doubt that the convention will be glad to get that information and we will take that up this afternoon or this evening. As this discussion

has apparently come to an end, I will now call upon Mr. D. W. Strachan of Tranquille to address us on "Mixed Farming." (Applause.)

MIXED FARMING

MR. STRACHAN: Mr. Chairman, Ladies and Gentlemen,—I recognize that I have the most difficult position of any of the speakers, because you are going out with me this afternoon and will see what I have been trying to do. If I were from Saskatchewan or Victoria I could tell you a lot of things and not be found out. I may say right now on behalf of the staff of the Alexandra Ranch that we extend a very hearty invitation to come out and see our place this afternoon. We are always pleased to see visitors out there.

Irrigation at King Edward VII. Sanatorium, Tranquille, B.C.

Mixed farming as an occupation has been almost entirely neglected in the West. In fact, in all new countries where pioneering has been done, and where land could be obtained for a trifle, it has been the custom to reap the fruits of the soil with as little labour as possible. The virgin soil covered by the vegetable deposit of centuries gave forth abundantly and scientific methods of farming were not required to produce good crops. This was true in Indiana, Illinois and Iowa, in the Dakotas, and again in our own prairie provinces. Hence grain growing became the favourite occupation of the farmer. He found that by ploughing up the sod, giving it a scratch with the discs and harrows and then drilling the grain, he could obtain very good crops and one man could put in 200 or 300 acres of crop.

The comparative ease with which this was done encouraged the farmer to strive for larger areas each year, and more and more slipshod methods were introduced. I can well remember in the early days in Manitoba, that when springs were late,

in order to get in the amount of acreage we would disc in the grain on the stubble. While this was something of a gamble such remarkably good crops were obtained sometimes that it encouraged the farmer to continue the system, which even in the present day is in vogue in many parts of Saskatchewan.

As a result of these methods the rich soil of the prairies in the older settled parts, has been depleted and infested with weeds, and the bumper crops, which were common in pioneer days, have become a thing of the past. The average farmer never thought of putting anything back on the land. It was a case of everything going out and nothing coming in; and the older districts are now suffering as a result, notwithstanding that much better methods are being employed at the present time. It is a fact that any system long continued becomes a habit and this is why the old timers found it so hard to adapt themselves to new conditions and adopt more modern methods such as rotation of crops. They had gotten into the wheat growing rut, and could not change to mixed farming which is the only solution to the question of worn out soil.

I once had the privilege of visiting a large packing house, where the guide explained to me that every part of the animal, from the horns to the hoof, was utilized; nothing was wasted. That is exactly the idea of mixed farming. There should be no waste products, everything can be put to some good use. One of the failings of our Western farmer is that he does not appreciate the stored-up wealth in his manure pile. I have seen the old timers let the manure pile up around their barns for years. I even knew one man who claimed that it was cheaper to move the barns than the manure. It is not until a man finds himself on a farm with depleted soil that he appreciates the full value of fertilizer. It is our custom on the Alexandra Ranch at Tranquille, to haul the manure every day and spread it on the fields, except for about three months of the year. During the growing season we are compelled to pile it, as we do not summer-fallow, and consequently have no land to spread it on. We have found this system works the best as there is less handling and less waste from seepage.

After the necessary expenditures for working equipment, such as horses and machinery, the mixed farmer should lay the foundation of a dairy herd. There is nothing which brings such quick returns on the farm. From the instant that he has purchased a good dairy cow the farmer has a source of revenue. She gives him not only the daily supply of milk, but also the increase. There is scarcely a location where dairying cannot be carried on with profit, as butter and cheese are concentrated foods and can be more easily transported than grain, hay or roots. This is particularly true in our own province where transportation from the farm to the nearest railway depot is always more or less difficult, and where the grain grower is at the mercy of the railway companies with their exorbitant freight rates. Another advantage is that the revenue from the dairy is divided over 365 days of the year, while the grain farmer has to wait until fall for his profits. Ready money means a great deal as the farmer can take advantage of all cash discounts. Profits and expenses go along hand in hand and he can tell his exact financial position at any time. Dairying encourages co-operation in the form of dairy associations and the interest is better kept up on account of the continuous profit sharing than is the case with the wheat farmer where associations thrive chiefly during the fall and winter months. Dairying is a very interesting business, but one which requires a considerable amount

of care and study. A farmer should use great judgment in picking his dairy cows, and after he has them, should keep a strict account of what they produce, so that he will be able to distinguish the producers from the boarders. At the Alexandra Ranch every drop of milk is weighed and a daily record kept of each cow during the year. By looking over these sheets we can readily tell which cows are paying and which are not. Some farmers imagine it would be easy to tell their good cows from their poor ones without keeping weight records. But this is not a fact. You would be surprised at the results. Some cows that you thought were very poor milkers will keep up a steady flow and at the end of the year will total up a very creditable supply of milk; while others that might be called spectacular milkers, who, for a short time after freshening give an abundant flow of milk, afterwards drop down and dry up long before the end of the year. Again, other cows will fluctuate so much from day to day that without a record one cannot tell where they stand. These last, however, are not a very desirable type. It might be interesting to you to know what our Alexandra Ranch dairy cows have produced during the last year. We have been keeping records for the past two years only, and therefore are just nicely started at building up a good dairy herd. One of our best cows produced over 11,000 lbs. of milk; three over 10,000 lbs. each; eighteen of them averaged 8,494 lbs. each; while the entire herd averaged 7,436 lbs. each. Some of these were only heifers with first calves. While a beginner must do the best he can with what he has, I do not think that the farmer who has been dairying for a few years, should keep any dairy cow around him that does not give over 7,000 lbs. in the year. Professor Gay in "Holstein Friesian," of recent date, states that the average farm cow gives about 3,000 lbs. of milk and 140 lbs. of butter in the year. Anyone can readily see that such an animal is a millstone about a farmer's neck, instead of a stepping stone to prosperity.

I do not think there is a better locality anywhere for growing the necessary food for dairy cattle, than around Kamloops. Under irrigation we can grow very heavy crops of mangels, corn, kale, grains and grasses. The question might be asked, "What kind of crops should a mixed farmer grow?" Besides the ordinary coarse grains, some kind of fodder must be grown which will supply good nourishing food for the whole year. Corn is one of the heaviest fodder yielders we have and is something that will grow well in any of our western provinces. True, it may not ripen in all localities, but it will mature sufficiently to give high food values. Last year we planted 10 acres of corn in hills 40 inches apart each way, and produced a bumper crop which yielded in the neighbourhood of 20 tons per acre. This made sufficient ensilage to feed our dairy herd for 9 months of the year, besides feeding some to our hogs, hens and range bulls. The cost of producing this was as near as we could estimate it, $3.50 per ton.

Alfalfa is another important crop to the mixed farmer yielding five tons per acre and up in this locality. Last year our neighbouring rancher cut four crops from his old alfalfa fields. One farmer up the North Thompson river told me he sold 85 tons off thirteen and one-half acres. Now, when we consider that alfalfa is equal pound for pound with bran, we see the enormous amount of milk producing food which can be obtained from one acre. In seeding alfalfa it is very necessary that the land be thoroughly cultivated and a good seed bed prepared. As our land dries out very quickly after irrigation in the hot days of early summer, we have found

it advantageous to sow oats as a nurse crop, seeding about eighty pounds to the acre. We then sow about fifteen pounds of alfalfa seed to the acre, which is quite sufficient, though seed houses recommend as high as twenty pounds. We harrow it in with a stub toothed harrow so as not to bury the seed more than one-quarter or one-half inch deep. The date of planting should be as early as possible in April. This year we commenced on the 17th of April. We did not inoculate either seed or soil. We cut the nurse crop from the first to the middle of July according to the season. There are two reasons for this. First, it cuts off the young alfalfa plant, thus checking its growth and giving it a sturdier root. Second, the nurse crop is removed at a time when it is commencing to smother the young alfalfa plant. If the nurse crop is allowed to ripen it lowers the vitality of the young alfalfa plant or even completely kills it. Last year we cut the nurse crop about the 15th of July and after that had a very fine second crop of alfalfa.

Mangels and sugar beets are also very heavy producers and are excellent food for all kinds of stock. As a substitute for good pasture and as a milk producer they have no equal, but are more expensive to handle than other crops as they require a great deal of hand labour. Other good fodder crops for late summer and fall are rape and kale. I tried both those crops on the prairies, sowing them in broadcast on breaking, and found they did exceptionally well.

It is very important that all seeds be thoroughly tested before planting in order to know what percentage to allow for poor germination. This year we experienced great difficulty with our corn seed, some not germinating more than 20 per cent, and very weak at that. It takes very little time to test seed and well repays the labour put on it.

With your dairy herd established your next step is to study your soil to find what crops are best suited to it. Certain crops grow better on sandy soil, others on clay loam, and so on. By setting aside an acre or two of land for experimental purposes you can readily discover what kind of crops do best on your particular farm. This does not take much time and is both interesting and helpful. Your experimental plot can be marked off in tenth of acre divisions, and the different kinds of roots, grasses and grains planted in these plots. Here you can watch them and compare their productiveness and food values, and estimate how much per acre they will produce. This is an occasion where you can bring the Department of Agriculture to your assistance. Bulletins are published which give you the chemical analysis and food values of every kind of crop which a farmer grows. Bulletin 72 is one of the most useful and instructive of these government publications. After you have estimated the tonnage per acre of your different crops you can turn to these government tables and figure out their actual food values. By comparison of these values you can tell which crop produces the most in food value per acre on your farm. It is also necessary to keep account of what it cost you to produce these crops. This you may not be able to do very accurately, but you can make comparisons which will aid you in coming to a conclusion as to the cost of production.

We must not lose sight of the fact that the dairy cow, the beef cattle, sheep and hogs, are the factories which change the raw material that we have produced on the land, into the finished article of milk, beef, mutton and pork. If our crops do not contain the necessary raw material, in the proper proportions required to manufacture these finished products, we are not giving our living factories a fair chance.

This brings us to the balanced ration. By referring to our government tables we can find, on the one hand the food values of our crops; on the other hand the proportional quantities of proteid carbo-hydrates and fat, required by the animal to deliver the goods. It is very important that the stock breeder should know this. For example, if a milch cow is given food high in carbo-hydrates and low in proteids she will be compelled to consume too large an amount of carbo-hydrate food in order to get the necessary amount of proteid. She will do this, but the excess of carbo-hydrates will be largely wasted. This is one of the leaks that will reduce our profits.

Again, if we cannot manufacture these goods at a profit, we had better quit business as we are playing a losing game. It is a common saying, "If you want to get rich quick, sit down and figure it out with a pencil." Take the kid glove farmer or a real estate booster, and with a sharp pencil and a quire of foolscap, he can figure out more profits in farming in ten minutes than you can make in a lifetime. Nevertheless, while that class of men wear their pencils off too fast, the average farmer does not use his enough. The judicious use of the pencil is just as essential to the prosperity of the mixed farmer as are any of his farm implements.

A few sheep should be on every farm, varying in number according to the size of the farm. These little animals bring in greater returns than any other line, when we consider the small amount of attention they require. During the lambing season they need some care, but after that, if a fairly hardy variety is obtained, there is no further trouble, as they are good hustlers and will look after themselves. They assist in keeping down the weeds and will pick up the grass in the fence corners and along the road sides which would otherwise go to waste. They are almost worth their keep as weed-destroyers alone. We keep from 30 to 35 head of sheep on the Alexandra Ranch and they do not consume three tons of hay in the year. Our flock last year averaged us over 12 pounds per fleece. This in itself, at the present price of wool, is a very good income for the capital invested. Then they should have at least 100 per cent increase for the year and the small farmer who is not overcrowded with stock, can easily make this 125 per cent. One rancher, Mr. Cornwall, who keeps about 215 ewes, told me the increase in his flock this year was 135 per cent. The total receipt for our flock for 1915 amounted to $431.81. From these figures you can easily see there is good money in sheep. Sheep in this country are not subject to epidemics or insect pests. Their only enemy is the coyote. Where these animals are plentiful they are a great detriment to the sheep business. Many remedies have been recommended but none are of much use except the coyote proof fence.

Hogs are another item of profit in mixed farming. There is always a certain amount of refuse from roots, grain and the kitchen, which can be utilized in the piggery, and a few hogs can always be kept to good advantage. They are something that require close attention as regards their feeding to know whether you are making or losing on them when kept in large numbers. It is absolutely necessary to have pasture, ensilage, and roots to supplement the grain ration. Young growing pigs do very well on alfalfa, pasture and rape, together with a little bran. The ensilage and mangels will take the place of the pasture in the winter season.

In discussing the profits to be made on different classes of animals we must not fail to recognize the importance of the sire in all of them. Some one has said that the sire was half the herd. I do not think that does the subject justice. He is much more than half the herd. It is surprising how quickly a herd or flock can

be built up by the introduction of a good sire. In a few years a very common herd may be built up to have almost the appearance of pedigreed stock. The pure bred sire will leave his mark on the offspring from the very first and overcome the undesirable qualities of the mongrel dam. Through years of careful breeding the good qualities of the sire have become pronounced and fixed in his physical make-up, while the mongrel dam, through years of haphazard breeding, has not that advantage, and her bad qualities, though many, are not so fixed in her nature. She has been bred backward and forward through different breeds and her faults are not inherited from one unbroken line of ancestry but are derived from a great many sources. Thus the pure bred sire, whose good points have been safeguarded and emphasized for generations, has these points firmly fixed in his nature and is sure to pass them on to his offspring. It is certainly astonishing how many farmers overlook this all important point in the breeding of stock. I really believe more money is lost to the stock breeder and the country at large, through neglect on this one point than any other. I would like to cite you two instances of this in my own experience on the Alexandra Ranch. One is in the case of rams. Our lambs in the fall usually dress from 70 to 90 lbs. Two years ago we purchased an aged ram which was all we could get though we knew it was not what we desired. As a result the weight of our lambs dropped 20 lbs. per head. From this you will see the great loss we sustained in the profit of our 30 sheep through this one bad bargain. On the other hand our hogs were a very ordinary bunch. We purchased a pedigreed Berkshire boar, and as a result our hogs have improved so much in appearance that one could scarcely recognize them as the same herd. The good results obtained from a pure bred sire can be very quickly recognized in sheep and hogs on account of the short time it takes these animals to reach maturity. Cattle and horses take longer to mature and show the benefits of breeding, but what has been said in regard to the smaller animals is equally true of them. The benefits of a good sire cannot be too strongly emphasized and the importance of this should be preached to the farmer day and night until he recognizes it, as his failure to recognize this is one of the greatest weaknesses he has. I think the Government should take some steps to prohibit the use of grade bulls, especially on the ranges. As things are to-day, the man who purchases a pure bred sire for range purposes has no protection whatever. Some might object to such stringent regulations on the ground that it would work a hardship on the small farmer, but I do not think the objection is well taken, as community bulls can be purchased and the Government has made provision to supply pedigreed sires to farmers' clubs, provided they will guarantee care and feed. The man who by careful breeding and selection creates a better and higher type of animal in any line, builds a monument to his memory that time cannot efface. He has done a lasting service to his country.

Mixed farming to a great extent would solve the labour problem. As the situation is now, we find the wheat farmers employing a large number of men during the summer months and discharging the majority of them when the fall work is done. This does not tend to build up a reliable working class. They know their situation is not permanent and consequently cannot take the same interest in their work as the man who stays on a place for years. They float in and float out, taking their wages with them. With mixed farming the farm hand would have a permanent position. He becomes interested in his work and feels that he is part of the institu-

tion. He spends his money in the district and assists in consuming what the farmer produces. In this way a permanent reliable working class is built up, with an abiding interest in the community.

There is a lesson for the farmer in the world-wide talk of "Preparedness." The nations of the world have been caught napping while Prussian militarism was making vast preparations for world conquest. So it is with the farmer. He has to combat the natural enemies that assail his crops and herds. If he does not thoroughly prepare the soil, making a good seed bed, he starts the seed on its life journey with a very poor chance of combatting its enemies. Give a young plant every chance in the early stages of its existence and you have gone a long way in preparing it for victory in the battle of life. The more experience I have in growing crops the more convinced I am of the importance of thorough preparation of the seed bed. Thorough cultivation of the soil will often increase the yield more than the application of fertilizer.

Mixed farming makes for better citizenship, higher ideals and a broader outlook. There is something uplifting in the study and care of live stock. The individual who loves studying and working with stock cannot fail to find himself the better for it. As he strives intelligently to build up a higher type of animal, he builds higher character for himself. Education is but the developing and training of all our faculties, and in what other vocation in life are all our faculties called into play as in mixed farming? Therefore, let us all unite to preach the gospel of mixed farming in the communities to which we belong, for by so doing we will weave a web of prosperity that will bring to us not only financial independence, but a higher type of citizenship; and we will be utilizing to the full the glorious heritage which God has given us in the rich soil of the western provinces. (Loud Applause.)

CHAIRMAN: That finishes our programme for this morning. I know you are going to enjoy yourselves very much this afternoon in seeing the way Mr. Strachan carries out the work he has been telling us about just now. This evening we will have a very good programme and I hope that after the exertions of the afternoon, you will not be too tired to attend this session.

MR. JOHNSTONE: I would ask that time for discussion be allowed for the last paper as to my mind it is one of the most interesting papers I have listened to for some time.

CHAIRMAN: I might say that we will certainly arrange a discussion on Mr. Strachan's valuable paper probably not for this afternoon, as you will have much to see down there. Probably it will be this evening or in the morning. I will now call upon Mr. Fairfield of the Credential Committee.

MR. FAIRFIELD: The Credential Committee had a meeting just before this session, but at that time there was a large number of delegates coming in and they informed us that a large number more would be coming in this forenoon with their credentials, so that the number of accredited delegates to report at the present time is much smaller than the actual figures. We had 62 accredited delegates this morning. (Applause.)

CHAIRMAN: That ends the business for the session and we will now adjourn.

172nd Battalion C.E.F. and Barracks, Kamloops, B.C.

WEDNESDAY EVENING SESSION, JULY 26, 1916

Mr. F. H. Peters in the Chair.

CHAIRMAN: The first item on this evening's programme is an address by Mr. J. F. Sweeting, Industrial Agent, Canadian Pacific Railway Company, Calgary, on

"THE POSSIBILITIES OF SUGAR BEET GROWING IN ALBERTA"

MR. SWEETING: Mr. Chairman, Ladies and Gentlemen,—The point of view on which I want to address you to-night is the value of the sugar beet and the production of sugar in an agricultural district. My address is: "The possibility of sugar beet growing in Alberta." By this is meant the possibilities of the commercial development of the sugar beet industry in Alberta, which are unlimited.

Sugar beet growing under irrigation on a commercial scale in Alberta covering a period of more than fourteen years has demonstrated that there can be no doubt as to the successful cultivation of this crop. Beet growing has been proven in that province, both as to tonnage and sugar content, and it now only remains a question of capital and labour to extend production up to market requirements.

As long ago as 1905 evidence was given before a committee, appointed by the Dominion Government to enquire into the sugar tariff, by a representative of the sugar mill in southern Alberta to the effect "that the sugar company had demonstrated that the beet sugar industry under proper conditions could be developed to an enormous extent in Alberta alone, and that the general conditions as to growth, etc., compared favourably with Utah and Idaho." This was followed by a statement to the effect that "about 1897 there was one factory in the intermountain states of Utah and Idaho producing about 12,000,000 lbs. of sugar. In 1905 these two states had eight factories and three cutting stations, producing about 75,000,000 lbs. of sugar and paying to the farmers of the two states over $2,000,000 for beets alone. Alberta has a much greater productive area than those two states."

These are quotations from the evidence given before the committee mentioned, and if one only gives consideration to the increased population in the West since 1905, one can readily see what the possibilities are for producing and marketing sugar in Alberta and her sister provinces.

Dealing for a moment with the question of the production of sugar beets in Alberta as regards tonnage and sugar content, two prime factors from the point of view of the farmer, as his remuneration is based, first, on sugar content, and second, on tonnage; the higher percentage of sugar, the greater the price paid and the larger the tonnage the better the resultant bank balances.

Experiments carried on, both in the Western and Eastern Sections of the Irrigation Block in Alberta show a sugar content as high as twenty per cent, while tests made at the Lethbridge Experimental Farm by Mr. Fairfield in growing under irrigation, and by Mr. Frank T. Shutt, in analysis of such beets, show a comparatively higher production in tonnage and sugar content than the general average production in the United States beet growing states. In some respects the comparison of growing sugar beets in large areas as against small areas may not be

considered just, yet the margin between the two in both tonnage and sugar content is sufficient to allow the statement to be made that Alberta can at least produce sugar beets on an equality with the United States in both respects.

I am inclined to think that this is quite a modest reasoning of the situation, but at the same time believe that it is perhaps advisable to adopt the slogan of "Safety First" when dealing with an industry, the development of which is only limited by the amount of capital it is able to obtain. The question of market I will deal with later on. Moreover, it would seem, from productions made during the years that beets were grown on a commercial basis in southern Alberta, that where proper attention was given to cultivations, etc., the average tonnage yield was high.

Tests made at Lethbridge, taking five different kinds of seed, show a per acre yield of 17½, 16½, 16½, 15½ and 9¾ tons, with a sugar content respectively of 17.68, 15.84, 19.42, 17.85 and 15.25; and a co-efficiency of purity of 90.6, 83.3, 90.0, 84.9 and 86.5.

Comparing these figures with production in the United States, we find California per acreage tonnage, 1911-1912-1913, as 10.42, 9.01 and 8.92; Colorado 11.07, 11.32, 10.92; Idaho 12.11, 8.55, 9.90; Michigan 9.90, 6.75, 8.85; Ohio 9.72, 7.84; Utah 13.03, 12.03, 12.21; Wisconsin 11.02, 10.27, 9.66; or an average for the whole of the United States of 10.68, 9.41 and 9.75. Turning to the question of sugar content, California shows the highest percentage for the three years under review with 18.95, 18.79, 18.04; Colorado 15.44, 16.19, 14.92; Idaho 16.65, 17.37, 16.24; Michigan 14.59, 14.72, 15.82; Ohio 15.95, 14.46; Utah 15.98, 16.37, 15.07; Wisconsin 14.23, 15.10, 14.10; or, for the whole of the United States, 15.89, 16.31, 15.58.

Before leaving this question of production, we will turn for a moment to the difference in tonnage in growing beets with or without irrigation as exemplified in Alberta, and for this purpose we will again have to have recourse to our good friend, Mr. Fairfield's, interesting experiments. The figures I have already given you, viz., 17½, 16½, 16½, 15½ and 9¾ tons, were, of course, grown under irrigation; whereas non-irrigated beets show from four different kinds of seed a production in tonnage of 12¾, 12¼, 9½ and 10½ tons. On a basis of $5 per ton for sixteen per cent beets, you can readily see the advantage of irrigation.

On the question of kind and suitability of soil, it appears to be a proven fact that for sugar beet culture it is safe to say that any of the soil types that are capable of producing grain or other crops will produce satisfactory beets.

Necessarily, the question of soil, climate, water application, etc., are matters for study in each and every district, but with the experiments which have been carried out in Alberta in the Lethbridge District, and both the Western and Eastern Sections of the Irrigation Block, there is no doubt that in these areas sugar beets can be produced under very favourable circumstances. The study which has been made of a wide variety of soils and climates in the United States in districts where beets are grown under irrigation, and under which they thrive, illustrates and emphasizes the wonderful adaptability of this remarkable plant to the wide range of conditions under which it may profitably be produced.

There are, of course, other factors in the production of the sugar beet, which will appeal to any community when it is able to realize the value of the crop as a rotation in conservation of soil values, and the feeding value of the beet pulp, tops,

etc. The sugar beet and live stock industries are analogous, and build up a successful and monied district as quickly, if not more quickly, than any other mode of agricultural development. Quite apart from the value of sugar production, butter, cream, beef, mutton, and so on, become part and parcel of the one undertaking.

From an economic point of view and to enable a sugar producer to make some kind of an impression on the sugar market, a mill of less capacity than 1,000 tons of beets per day is not altogether wise. A mill runs from 70 to as long as 120 days per year; take the average at 90 days, this would mean about 90,000 tons of beets, or taking an average of ten tons per acre, it would mean an area of 9,000 acres would be required as the minimum of the mill. Some 2,500 lbs. of refined sugar is produced on an average from an acre of beets, or say from 237 to 265 pounds of sugar from each ton of beets—90,000 tons of beets would produce about twenty-two million pounds of sugar. The consumption of sugar in Alberta in 1915 was approximately 42,000,000 pounds; in British Columbia, 33,000,000 pounds; in Saskatchewan, 50,000,000 lbs, and in Manitoba 43,000,000 pounds, or a total for the four western provinces of 168,000,000 pounds. To take care of this consumption, approximately 88,000,000 pounds were shipped in from the Pacific Coast mill, the balance being taken care of from the East. I mentioned at the beginning of this paper the question of market. From the above figures you will see that there is a difference of eighty million pounds of sugar to be produced in the West, or say four sugar mills of 1,000 tons of beets per day, or 36,000 acres of beets at ten tons per acre, and taking an average of twenty acres to each farmer, 1,800 beet farmers. It is easy to calculate to what extent this industry can be developed in irrigated districts under proper control, and get an idea what the fostering of beet growing and sugar production may mean to the West in years to come. I might mention that the total production of sugar from beets in Canada in 1915 was only 37,000,000 pounds, yet tests show that the difference between sugar produced from beets and sugar from cane are not recognizable as to quality, and as a matter of fact what difference there is is not sufficient to favour one or the other from the consumer's point of view; but the real economic difference is in the stability that the beet sugar production gives to an agricultural country.

Before concluding, I want to touch on the importance of steps being taken to produce the sugar beet seed. Austria and Germany have been for many years the principal producers of beet seed, and hundreds of years of careful selection has resulted in the best seed being grown in those countries. The United States has hitherto practically imported all its seed from those countries, and last year imported 14,768,200 pounds, which cost the farmers $1,069,390. Imported seed, then, cost the farmer from 15 to 20 cents per pound, or $2.25 or $3.00 per acre.

The European War somewhat disturbed the situation in regard to seed, and, I undertsand, at one time the acreage contracted for in the United States was in doubt of being seeded until Great Britain, at the request of Washington, allowed the shipment of a large tonnage of seed which was at Rotterdam, to be made to the United States.

The raising of seed in the United States is as yet really only in the experimental stage. It is being tried in Utah, Washington, Northern Colorado and California. In Washington there is one farm producing seed for commercial purposes with satisfactory results. A good many factors enter into the successful cultivation

of seed, and much study would have to be given to soils, climates, etc., before deciding on locations, but the production of seed as an industry is something that will have to enter largely into the question of sugar beet production before many years pass over us. In other words, we must put ourselves in the position of being dependent on our own supplies of seed to take care of our sugar requirements. (Applause.)

CHAIRMAN: If there are gentlemen who would like to ask any questions or discuss the paper now read, the meeting is open for them.

MR. MYTTON: I thought there was some gentleman's name down on the programme to lead this discussion.

CHAIRMAN: No; but if you would like to ask anything we will be pleased to have you do so.

MR. RANKIN: I remember when I was last here Mr. Lawrence introduced me to some gentleman who had made a success of it, and I thought if he were here to-night he might like to have something to say.

MR. LAWRENCE: Mr. Moore, of Agassiz, was to have been down to lead a discussion upon this subject. He is the Superintendent of the Demonstration Farm down there, and we have been relying upon him to be here for that purpose. As he is not here to do that, I would ask this question, a question which is a burning one in this district: Is it necessary that there should be a certain amount of lime in the soil to grow sugar beets successfully?

CHAIRMAN: I believe Mr. Moore is in the audience. Would you care to answer that question, Mr. Moore?

MR. MOORE: Mr. Chairman, Ladies and Gentlemen,—This is really presumption upon the part of the local Secretary and also upon the part of the permanent Secretary, because I told them I did not know anything about sugar beets, but what I know would certainly start a discussion, and if you want that I will certainly tell you all I know about it. (Applause.)

I have been carrying on very much the same experiments as Mr. Fairfield, only I have been doing them not under irrigation conditions. As far as I have gone in the past five years in the work, the growing of sugar beets in the lower Fraser is absolutely out of the question, and particularly from the prices the last speaker has given for the material. I cannot produce sugar beets at Agassiz and pay twenty cents an hour for ordinary labour and twenty-five cents an hour for a team, and pay interest on $150 an acre on land. That would be the quickest way for me to starve to death. I got nearly as much in yield as Mr. Fairfield does. As I remember it, we got very much the same percentage of sugar as has been given, but there is no way to produce it unless we can get cheaper labour down our way. It all hangs on one word, and that word is "labour," and when we have not got it we cannot do anything else but leave sugar beets alone. If anyone wants a discussion they can now have it.

DELEGATE: Give us the values of the sugar extracted.

MR. MOORE: There are only two. As far as the top is concerned, it is not worth anything. As a food, it is not worth anything. If you put it into dairy cows it will scour the cows. Dried beet pulp is an excellent food in its own class. For dairy cattle it is very good. If we had that in our country it would be worth something. The molasses which would come from the factory is also valuable, but not as valuable as molasses that come from other sources, as has been proven by experiments. You can put it in this order: The top is worthless; the pulp is worth a little.

DELEGATE: I would like to ask about the average weight of sugar beets. I bought some sugar beet seed this spring, or what was supposed to be sugar beet seed, and I sowed it and got some that weighed something like seventeen pounds.

MR. FAIRFIELD: Answering the question Mr. Lawrence asked in regard to whether the soil must contain a certain amount of lime, I think Mr. Sweeting has covered that by saying that sugar beets can be grown successfully on any soil on which grain crops will grow. Grain crops will not grow on soil that is not well balanced, and sugar beets will not grow on one that is not well balanced, but will grow, as far as my observation goes, on any soil that will produce ordinary grain crops successfully and well. From the knowledge that I have, which is a rather limited knowledge, of sugar beet growing in the United States, the most successful sugar beet factories have been started in the drier parts of the country. They have been most successful, perhaps, in the irrigated areas. In those areas the rainfall is less and there are more mineral salts in the soil because where the rainfall is limited these mineral salts are not washed out of the soil. Of course, sugar beets will not grow on an acid soil, but will grow on a soil rather strongly impregnated with saline matter—not in a soil that we would call an alkaline desert.

I am fairly well acquainted with the operation of the factory that was operated in southern Alberta for some seven years. It is not in operation now. One of the principal reasons that it did not keep on going was the fact that the management did not bring in the proper labour. They depended upon local labour and Indian labour. There were other reasons, too, but that was the principal reason, and I think if they had the proper labour sugar beets could be raised profitably under conditions as they exist in southern Alberta. Looking at it from my point of view as a layman, it seems to me to hinge on the question of labour. If the manager does not see to that question of labour, that is, thinning and topping, the factory cannot be operated successfully.

MR. FRYBERGER: I did not intend to say anything on the subject of sugar beets at this time because I have a discourse for to-morrow and that will enter into whatever I have to say, but I feel it is important at this time because it is better to strike while the iron is hot, and I believe from what experience I have had in growing sugar beets that they can be grown successfully, at least in Alberta under irrigation. I will have something to say about that to-morrow.

Mr. Sweeting gave a statement of the prices paid by the Southern Alberta sugar factory, but he did not mention that those were the prices paid several years

ago when we were paying five and six cents a pound for sugar. At that time, and previous to that, beets were being raised in the United States for $4.00 and $4.50 a ton, flat rate, but since that time they have paid for the same beets or beets not richer in sugar, as high as $8.50 a ton. So, in growing them on a sliding scale, we would be governed by the price of sugar, and it is a question whether it will be maintained at its present high price.

I have been experimenting in sugar beets somewhat in the Eastern Section of the Irrigation Block, and I have been doing it on ground that had not been previously prepared for the growing of sugar beets. I mean by that, it never had alfalfa on it and had not had manure or fertilizer used on it whatever. I succeeded in growing ten to twelve tons per acre. Last year some of those beets were sent down to Billings, Montana, to be tested as to the saccharine content, and they tested twenty-two per cent, and I understand the report can be seen at any time.

So far as the tops are concerned, I do not know just what the gentleman had reference to in regard to tops. If he took and twisted the top off the beet, it has no value. As we understand the tops when you sign up a contract to grow sugar beets for a factory, the contract states that you must cut the top off at the base of the lower leaf, and if you have beets weighing eight to ten pounds you would cut off about a pound of it. That is almost as rich in saccharine as any part of the beet, but it is so far above the ground that it is full of impurities and the factory refuses to take it. That is the value of the beet top as we understand it. I know in the sugar beet district if you take a crop of ten to fifteen tons to an acre you will have no difficulty in selling tops at three to five dollars an acre. I have used them myself and know that they are good food and as good as the sugar beet itself, and better. Sugar beet is a strong food and a beast that has not been fed on it right along will scour if given a big beet at one time. I will guarantee if you turn out your cattle in a field of sugar beets, properly topped for the factory, they will let all other food go until the tops are all eaten up. I consider it the best food there is. If I had horses that I wanted to fatten quickly I would rather turn them out on sugar beet feed than feed them hay and oats. I have had experience in this and know it.

Another thing, in districts that have had sugar beet factories, sugar beet growing has grown and means more money to spend and the farmers have gone ahead faster than in other parts of the country. I have made more money at growing sugar beets than any other one thing. I am satisfied that under irrigation in Alberta, sugar beets can be grown and I hope will be grown for commercial purposes. I believe it to be the only thing to bring the land up to make it worth what it cost. It creates lots of labour. As has already been stated, that is the important part of the question. My experience has been that if we ever succeed in getting a factory, the factory will see to the labour question. If they think enough of the proposition to come in and invest the money they will first investigate the labour proposition. As has been stated, the labour has to be imported and it can be imported into British Columbia or Alberta just as easy as into any other place. I had a talk with Mr. Elson, who has charge of the Southern Alberta factory—that was in 1913—and he told me that he paid $15.75 for the entire handling of the sugar beets per acre.

DELEGATE: Where can you get the labour?

MR. FRYBERGER: I have paid as high as $20 in Colorado. I have been asked where we will get the labour. That is not my part of the proposition. I said the factories will look after that. You can rest assured that no factory will come in until they know where they are going to get the labour and all you have to do is to notify their labour leader that you need certain labour at a time and you will get it. We may have to pay $22 to $25 an acre for the same thing that we get from $15

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to $18, but will likewise get more for our sugar. We are paying up to $10 for a sack of sugar where we used to pay $6. I have had a talk with the auditor of the sugar beet factory in Colorado. Mr. Porter was at that time superintendent of the ditch under which the beets were grown, and he knows Mr. Stackhouse, the auditor of the sugar factory. This factory drew beets from a radius of five miles around and he told me that from September to January their factory paid out an average of $40,000 every two weeks to the farmers. You can imagine what that would be to a community of that size. The cashier of the First National Bank told me that ninety per cent of the money paid to the Mexicans stayed right there in the community. I have been to public sales, time sales, where a small cash discount was given on the purchase and ninety-five per cent of the money of the sale was paid over in cash. Everybody had money, but unfortunately, after a while, the water played out and people quit growing sugar beets and the hardest time was then had in that country. I am heartily in favour of sugar beet growing, and I think you can make it pay.

MR. JOHNSTONE: I think this discussion is a rather peculiar one. We can all grow sugar beets. The whole problem is one of labour. You cannot import labour into British Columbia.

MR. STRACHAN: I don't know very much about the growing of sugar beets. We had a test recently. Seeds were supplied for one-tenth of an acre, which plot no doubt some of you saw to-day at the ranch. If I could hire men at $22 an acre to handle beets I would be tickled to death to get them. We have had very good men at our ranch and some would handle them at $40 an acre. I would like to grow mangels that I could handle at $40. Maybe Mr. Fryberger could give us some information as to how it can be done. It appears we are on the wrong side. There is something wrong with us or our men. There must certainly be some other way of handling mangels or sugar beets than the way we have been doing. The cost of handling it is enormous as compared to the idea Mr. Fryberger has.

MR. FRYBERGER: That does not include all the labour. That includes thinning, hoeing and the topping, that is all. Of course, I don't know what the labour would cost to-day. I have not been growing sugar beets, except what I take care of myself. I quoted to you what Mr. Elson gave me as the cost in Alberta. That is the nearest I can tell you. Of course labour is higher now. The price of sugar is correspondingly increased so that we can afford to pay more and make as much money.

MR. MYTTON: I have been very much interested in this discussion and I hope that there will be a verbatim report made of this so that I can later use the statements made here to-night. There are a great many people in the company which I represent who would be interested in this and I would like to give them this information. I have heard it is profitable for the farmers to produce sugar beets here and I hope it is. Will some gentleman tell us if it is possible for farmers to produce sugar beets and would it be possible for a factory to produce sugar beets on a farm.

CHAIRMAN: A verbatim report is being made of all the proceedings of this convention.

MR. THRUPP: Mr. Sweeting mentioned that the minimum area which could be relied upon to make a factory pay would be 9,000 tons.

MR. SWEETING: 90,000 tons; 9,000 acres.

MR. THRUPP: Here you would have to haul the beets a considerable distance from the farm to make a success of it. That would limit the amount of sugar beets that could be grown here.

MR. SWEETING: Experiments show that in the United States they do not put factories in an area where they cannot get the proper acreage. You cannot haul the raw product any distance to make it a success, neither can it be held in shipment. My understanding is that the fine sugar costs $1\frac{3}{4}$ cents to produce.

CHAIRMAN: I think we have had a pretty good discussion on this point. I think the Secretary has a news bulletin which I will ask him to read.

The Secretary then read news bulletins which were of such a nature as to arouse loud cheers and applause.

CHAIRMAN: We are next to be favoured with a song by Miss Brown, the Nightingale of Kamloops. (Applause.)

Miss Brown then charmed the convention with her rendition of "When Irish Eyes are Smiling." (Applause.)

CHAIRMAN: The next item on the programme is a paper by Professor L. S. Klinck, Dean of the Faculty of Agriculture, University of British Columbia, which will be an illustrated lecture of "Improvements in Corn Varieties."

PROF. KLINCK: Mr. Chairman, Ladies and Gentlemen,—I think after listening to that splendid solo interspersed in our already heavy programme, that it was just the thing that was required to give the programme a balanced ration. (Laughter.)

What I hope to do this evening is to touch upon the growing of corn and the selection of the proper strains in which you are interested in this district. One thing that has impressed me at this irrigation convention is the emphasis placed upon live stock and agricultural education, but back of the successful handling of live stock, back of the successful handling of the soil for the production of horticultural products there lies the proper management of the soil which is so important in the growing of any successful crop.

In the corn plant we have a high-yielding, nutritious, palatable and succulent roughage for live stock which may be used as a soiling crop during the late summer and early fall, or as an ensilage during the entire year. This crop gives promise of becoming of very great value, especially to the dairymen of the province and, as more information is gained relative to the exact conditions essential to its successful culture, the more rapidly will the acreage devoted to its cultivation increase. In many districts silos are becoming common and, in the majority of instances, the owners are planning to fill them with corn ensilage.

As a result of the increasing appreciation shown by live stock men of the great asset they have in the corn crop, there is a growing demand for information as to the best varieties for different requirements and for different natural conditions. Unfortunately, little experimental data obtained in this province are available. Aside from variety tests conducted by Mr. P. H. Moore, of the Dominion Experimental Farm, Agassiz, B.C., but little work has been done with a view to determining the varieties best adapted to different parts of the province, and, so far as I am aware, no breeding experiments with this crop are now under way.

The first step to be taken, therefore, is to secure reliable data as to the behaviour of the most promising sorts now offered in the trade, and then proceed to improve the best of these by selection and breeding, providing we find that we do not now have a sufficient range to meet our varied needs. In the meantime we should confine our attention to the cultivation of those standard varieties which experience has shown to be best adapted to our requirements.

Since eight-rowed flints are usually earlier in maturing than the large twelve-rowed varieties, they should be planted in districts where the growing season for

crops which are easily injured by freezing is short. In localities possessing a longer immunity from frost and where the average temperature is higher, the late maturing dent varieties may be most advantageously grown.

In order to secure a dependable supply of the variety required, the grower must not only be well versed in what to look for in a sample of seed corn, but he must know a good sample when he sees it. What constitutes a good sample depends upon the conditions under which the corn is to be grown, and upon the use to which it is to be put. For ensilage purposes, the corn which gives a moderately heavy yield, coupled with quality, is much to be preferred to a very heavy yielder which does not produce well-glazed ears by ensiling time. Likewise, a variety which produces a low tonnage of fodder but a high yield of matured grain, is not so desirable an ensilage corn as one which yields a heavier tonnage of stalk and leaf, coupled with a high proportion of well-glazed ears.

Evidence of breeding, of proper maturity, and of probable behaviour when planted can always best be studied when seed corn is purchased in the ear. Until our farmers insist upon being supplied with ear corn instead of with shelled corn, as at present, the difficulties of securing a dependable supply will continue to be very great.

Professor Klinck then illustrated his address with numerous slides, many of which had been specially prepared for the occasion. All the slides used were original and were based upon his experimental work covering some nine years at Macdonald College. These slides showed very clearly the different classes of commercial corns—dents, flints and sweets—and furnished the basis for the discussion of the suitability or otherwise of different varieties and strains for different conditions. The strong and weak points in kernel formation were emphasized, and particular attention was directed to the evidences of low vitality resulting from immaturity, from freezing or from improper storage.

THURSDAY MORNING SESSION, JULY 27, 1916

CHAIRMAN (Senator Bostock) in introducing Mr. P. E. French, Assistant Horticulturist and Inspector of Fruit Pests, Vernon, B.C., said: "We are, of course, sorry that Mr. Young has not been able to meet us here. We were all looking forward to meeting him here and discussing with him the question of water distribution which, in this part of the country, is of very great interest to a large number of the delegates. Mr. Lawrence has just handed me a telegram which has come in from Mr. Young as follows: 'Owing to important matters in hand impossible to attend convention.'

I will now call upon Mr. French to address the meeting."

POTATO AND TRUCK CROPS UNDER IRRIGATED CONDITIONS

MR. FRENCH: Mr. Chairman, Ladies and Gentlemen,—I am very pleased indeed to have this opportunity of speaking before the members of the Western Canada Irrigation Convention and on a subject which is probably one of the most

important under irrigation. The subject allotted to me is, "Potatoes and Truck Crops under irrigated conditions."

When we take into consideration that there is more food value produced from potatoes than from any other crop produced in the world, we can realize its importance. However, it is a business that is very speculative. Prices vary a great deal from year to year and one must stay with the business year in and year out to make money out of it. If they do not, there has to be very good profits indeed to make it come out right. A good rule in growing potatoes is to plant when the seed is cheap. That does not always follow out, but generally speaking an average grower puts in a large acreage when he has to pay high for his seed. As a side line to orcharding it is a profitable business. In many cases I have practically made my expenses on my young orchard by using the ground between the young trees for vegetables or potatoes. Last year at Salmon Arm we made a considerable profit above all expenses. However, we all cannot do that. If everybody went into the business our present market would be over-stocked. As I said before, any one who is going into this business must give the market a fair study. We have unforeseen fluctuations. The price is often low and the prices generally depend upon our market.

I think it is the duty of the truck growers to advertise their product and in that way increase consumption of their products and extend our markets. The consumption of potatoes in the United States is only three and one-half to four bushels per capita. In Europe it is three times as much. A good move was made last year by shipping potatoes to Australia and it turned out all right. It is up to the growers themselves to start the movement. They have in fact started. The government will probably come to their aid after a while. We must advertise our potatoes and other truck garden products the same as we do other crops.

One great disadvantage the truck grower has to contend with in this part and other dry belts of the province is that our markets are all far away. We have no market at our door. We have to ship considerable distances and to make money out of it we have to be in it on a fairly large scale. I have seen very few "democrat" farmers make a success of it in the upper country. To get the retail trade you have to be very close to the city or in it. We can produce the quality second to none and we can produce large quantities of it under irrigation, providing we can get the markets. We must try to get into evaporators and storage plants. The evaporators were the salvation of the Okanagan district last year. They took all the surplus stock. If it had not been for that business the prices received would have been very low indeed. I think it is up to the growers to advertise their business and see that it gets on to the market in better shape.

Another drawback is Chinese labour. The Chinese question is one which will have to be dealt with sooner or later or the white man will be forced out of business in the upper country. The Chinamen are telling us now that in a very few years they are going to own the Okanagan valley. That may be so or may not be. It has to be given careful thought. It was all right so long as we had the Chinese working by day labour and not competing with us in producing. At the present time they are renting land and I think 75 per cent of the vegetable business in the Okanagan valley is in Chinese hands. The buyers, with the juggling of the Chinese, are able to control the market. The Chinese living conditions as we are all aware are entirely different to those of the white man. The Chinese grower has no money

in the business. He rents his land and he grows the stuff. He pays a fair rent for the land and if he cannot sell his stuff, he goes away and leaves it. The only thing he has to lose is his own labour. It is a question which will have to be taken up sooner or later or we will have the same trouble as they had in California.

We must bring down the cost of production as much as possible by the use of machinery and by getting right down to hard work. We have a good many growers who are making big money out of the business and we also have a good many who are only playing with it. We must get into the carload shipping class and ship out in large quantities. The average production in the United States of potatoes alone is only 89.8 bushels per acre; in Great Britain 186.4, or more than twice as much. How is it that we have just as good land as they have and we are not working it or keeping up the fertility of the soil? The success in growing a crop depends upon the stand we get and to get a good stand we must have the proper kind of soil and keep up the fertility of that soil. It is absolutely useless for any one to go into the vegetable business on played-out, weedy soil or soil that has been played out without anything being put back in it. We must have a soil easily worked, and we usually find that sandy loam, well drained, and under irrigated conditions, will give us the largest returns.

We must follow out a proper rotation of crops. Most of our potato growers have been trying to grow potatoes on the same ground five and six years in succession. They are only just now beginning to find out that their crops are getting less and less all the time. It is time for a change. It is the same with all our work. The conditions are changing too and we have to change our ways for that reason. Probably the onion crop is the only crop we can grow on the same ground year in and year out. Probably they give better results when grown on ground year after year. That is probably due to the care that the onion has received. As a rule, vegetable growers will spend more time on that crop than on other crops. They keep it freer from weeds and that keeps down the cost of labour. Then we must have our soil well drained and we must be very careful in our irrigation. That is probably the most interesting point to you here to-day. To get that good stand it is often necessary to irrigate our land before we plant the seed. That is not done as often as it should be. This is particularly true of the drier sections in the southern Okanagan. As I said, we must get a good stand. It is a loss of time and money to be working with only half a crop and to get that good stand we sometimes have to irrigate before we put in the seed.

In potatoes we find that a fairly loose seed bed is what is required. It is just the opposite with the other crops. In the potato business seed should be planted down in the moisture of the soil, and we do not need it so firm as we do with other crops; our ground should be ploughed in the fall and worked up thoroughly in the spring. It is not necessary with all truck crops, but it is well for the potato crop. The onion seed should be put in early in the spring and to do that early in the spring we should do the ploughing in the fall. The onion and the potato are planted first as the frost does not hurt them as early as it does some of the other crops.

With regard to fertilizers. Of course, there is no fertilizer in the truck business that will come up to the good old barnyard manure. Possibly in the vegetable business more commercial fertilizers are used than in any other crops. It is probably true more with truck crops than potatoes. We have, however, little experiments yet

in regard to fertilizers to go by in the upper country, but in Summerland and at Windermere, we expect soon to be able to give you more definite information from those sources. Most of our growers are looking ahead and do the best they can but some are not doing anything.

Waterfront, Kamloops, B.C.

Little has been done in the way of seed. This is probably the same as Professor Klinck said about corn last night. It is the most important thing in the business. In selecting our potatoes we should make it a practice to grow our seed in a separate place for that purpose. We should take it out from a hill producing a large number of medium sized potatoes. We do not need to do that every year, but if we do that for a season we can increase our production. The potato seed usually runs out in three or four years, but by keeping up the selection we can keep up the vitality. One way to keep it up is by the mulch system. In Nebraska they have been doing that for eight years. They have found that they can improve it by growing a certain percentage under mulch conditions. They simply have their ground in a good, moist condition in the spring, when planting the potato and soon after planting it is covered with a straw mulch or old hay to a depth of four inches when it is sunk down. The growing of good seed requires a cool soil and that is the idea of mulching. Under those conditions a farmer even if growing cultivated seed for some five or six years will, after growing it for one year under mulch conditions, bring back the vitality of the seed and get as good returns as by importing potatoes from the north. The potato does well at a high altitude and grows in good quality and where they are in the business on a large scale they often import their seed which has been grown under those conditions so that possibly the mulch system of growing seed might well be experimented with in this district.

Another point is, I think, that in our vegetable sections in the dry belt, we might grow seed for use at the Coast and for other centres. I think we can grow it cheaper. The reason for advocating that is that in the Coast sections, they are troubled with blight. The cost of the production of pure and clean seed is greater than in the dry belt. Under present conditions with the high prices of bluestone, it costs eight or ten dollars an acre to spray those potatoes to produce clean seed. I think there is a chance of a market in our irrigated section for that. A number of people claim that the irrigated potato is not as good as the non-irrigated potato for seed, but if we use our water intelligently and thoroughly, I cannot see any reason why our potatoes should not be as good in the irrigated district as in the non-irrigated district. The main point is to keep our crop growing without any check. It will depend, of course, upon our district and our season as to how much water to apply. We must keep it growing without a check. If we allow a check and then put on water we get a great many misshapen potatoes. So, do not wait until the potatoes get dry before you apply your water. To make money out of the business we must have our land fairly easy to irrigate.

In buying seed for other truck crops, we should be very careful indeed to get the best. It is very poor policy to buy cheap seed. Many of the growers should be growing their own seed. This is something that is done only on a very small scale at the present time. I would not say that it would pay us to go into the seed business and produce it for sale. The cost may be rather too high for that, but there is no reason in the world why we should not do it for ourselves. Those who are doing it are getting much better results than by buying their seed from other sources. We can easily grow onion seed, carrot seed, and other seeds in this district and the Okanagan district.

For early production we must have an early soil. A sandy loam soil containing a great deal of decayed vegetable matter is a very good soil. It is better to stay where there is late production and get a large crop. In planting we usually advocate putting in our early potatoes at as shallow a depth as possible. Our later potatoes are a little deeper. We get better results by putting in early potatoes two inches deep. Have the ground thoroughly worked up. Put them in warmed-up soil. If we put them three or four inches below the soil we find they decay. The late potatoes can most economically be put in at a depth of four inches and the potato planter is a great labour-saving machine in that way. It is more economical in harvesting and more economical in cultivation. The plants are at an evener depth and in straighter rows and in that way we can cultivate the crop much easier. In planting onions, carrots and parsnips we should have a nice firm seed bed. If we do not we are very apt to get a very irregular stand from the standpoint of growth. The idea is to get the moisture to come to the surface. By rolling a couple of times and finishing off with a smoother we have the moisture come right up to the surface to germinate the seed. We lose a certain amount by evaporation, of course, but we must have the moisture right close to the surface. We can easily irrigate the crop after the crop is up to supply the required moisture later on. Our vegetable seed should be put in $1\frac{1}{2}$ to $1\frac{3}{4}$ inches deep, which will be found to be plenty deep enough for most of our garden truck. The greatest trouble that potato growers have had in dry belts with diseases is the potato scab. The main reason why it has become so bad is that people have been trying to grow potatoes on the same

ground year after year. I do not think it pays in a commercial way where we are growing potatoes in large quantities to treat our potatoes for potato scab. We should be careful to use clean seed. It has been proven that spores of this disease are in the soil and it is absolutely useless to plant clean seed in scabby soil and expect to get clean potatoes.

I see my time is already overdue, but it is a hard subject to deal with in a short time and give exactly what I would like to give. I would sooner have a little discussion on it and answer some questions than go any further. If there are any questions you want to discuss we can probably get more readily the points desired to be brought out.

MR. WILLIAMSON: What is the best digger and picker and the one that will put potatoes in the sack?

MR. FRENCH: I do not know of any digger that has been a success. The trouble is that it will not discriminate between a stone and a potato. The potato digger that has given the best results in our conditions is one that lifts the soil and the potato and leaves the potato on the ground at the back.

MR. WILLIAMSON: But this year you could not get any one to pick the potatoes off the ground.

MR. FRENCH: The labour problem is one that is difficult and if any one is going into the business they should figure out their labour question beforehand.

MR. DAWSON: What is the most profitable variety of potato?

MR. FRENCH: We find certain varieties do well in one district and not in another. One of the best grown in the Okanagan is the Early Ohio. Early Rose is grown more than any other. It is not exactly an early potato, but it produces a large crop and if you cannot sell it early, you can sell it later on, although it is the wrong colour to sell as a late potato. You should have a white potato. It does not always mean that the white potato is better than the red. Quite often the red varieties of potatoes are better. We have Carmen Number One; Netted Gem; Gold Coin; Wee Macgregor and the Empire State. Money Maker is one of the best qualities in potatoes which we grow, but it bruises rather easily and it spoils its appearance on the market. It is best to have a variety with a netted skin or one that does not bruise easily. Those are some of the best varieties at the present time. The Million Dollar is grown around Armstrong and under clay conditions is one of the finest looking potatoes we have.

MR. STRACHAN: I understood you to say the potatoes grown at a higher altitude are better potatoes. Those on the higher altitudes I have found to be soggy or water-logged and they stayed that way after they were cooked and they do not seem to have ripened properly.

MR. FRENCH: That is not usually the condition. You must have soil conditions to make them soggy. Generally speaking the potato grown in the higher altitude is a better potato than that grown on bottom land. It does not always follow that way, but generally speaking it does.

MR. MITCHELL: I might say that I have a ranch 2,000 feet above sea level. To-day, we are using potatoes that we grew last year and I will guarantee that there are no better potatoes than ours. I understand that the low land is swampy land and the potatoes grown on that land would not be as good as those on a higher altitude. The potatoes grown in high altitudes are really better keepers.

MR. STRACHAN: We purchased potatoes that were grown on a side hill and they were soggy and those grown on our land in the bottom were better and I have had people refer to them. I am, of course, speaking of the country to the north of here.

MR. FRENCH: Is your soil a bottom land soil or is it on the bench?

MR. STRACHAN: It is grown on the irrigated land about one hundred feet above the river.

MR. FRENCH: Oh well, that is not what you might call bottom land.

MR. STRACHAN: I always purchased potatoes grown on high land and they rotted before the winter was over and when I tried cooking some of them they still had the same soggy appearance that I speak of. They were not under irrigated conditions at all—these were grown under dry farming conditions.

MR. LAWRENCE: I break a lance with Mr. Strachan on this subject. There are and have been grown for several years past potatoes, namely, Vermont Gold Coin, in our district at an altitude of 2,500 feet above sea level and those potatoes have such good eating qualities that we are eating them to-day and they are as good to-day as they were at the beginning of the season. The potatoes that Mr. Strachan is speaking of must have been grown some place where the soil was heavy and the water lies continually. There are places in this district like that and when potatoes were being grown in that particular district a few years ago, I was in the unfortunate position of having to find a market for them and ship them out to the prairies and I found some difficulty in doing that. But, even that matter has been dealt with and where the land is heavy, they are now growing celery and cabbage and a short distance from those places they are growing excellent potatoes. It is all a question of soil. With the soil we have here, and being able to put on just the right amount of water, we can get bumper crops of potatoes and quite easily better than the potatoes Mr. Strachan has spoken of.

MR. WILLIAMSON: I feel very sorry for any man who has to go into this kind of business. The Cypress Hills country I may say is about 3,200 feet above the sea level and you might just as well try to suck a sponge as eat a potato off the Cypress Hills, but the potato from the low part of the land is quite good.

MR. FRENCH: You must have a lot of moisture in those hills to have that kind of potato. It is not usual. I know in my own case my bench land potatoes always keep better than the ones on the bottom.

MR. FRYBERGER: Do you find that after cropping land for four years it injures the land or do you follow it with grain crops? How does it leave the land?

MR. FRENCH: It leaves the land in very good condition for grain crops. I would say follow with clover or follow with grain.

MR. WOODWARD: I think the quality of the potato depends greatly upon the quality of the soil and the water. From the remarks passed here it appears that different people have raised different crops of potatoes on almost the same soil. Possibly the ingredients are not in the soil to produce the first-class potato. It has been proved that phosphorus and potash are required to produce first-class potatoes. If these are not in the soil you will not get the best potato. In the way of a soggy potato a great deal has to do with the treatment. You can take sandy land which is always recognized as a land to bear mealy potatoes, but I took a row here and a row there and still got soggy potatoes. If you irrigate your potatoes too much after having reached a certain stage, and that stage is just while the potato is in blossom, you will have a soggy potato. The potato will hold moisture. Then again on clay lands you cannot irrigate so often and the system I find on clay land is to hill up well and make your ditch deep so that any excess of moisture will go to the bottom and the potato will dry. The potato does not require a great deal of moisture, but only sufficient to grow. I find if you can take the ground in your hand and mould it easily, it is moist enough to grow any potatoes or vegetables.

MR. FRENCH: As I said before, a whole lot depends upon intelligent irrigation. We must not let irrigation take the place of cultivation which a good many of our growers are doing.

MR. WOODWARD: They have given the results but I do not look upon their results as any criterion of the quality of the potatoes. How did they treat the potatoes? You can treat the potatoes in the best of soil and get dry and soggy ones together. If they all treated them the same and the soil was the same there must be something wrong. I have farmed at 3,000 feet and 700 feet and I have found that just as good potatoes can be grown at 700 feet as can be grown at 3,000 feet. I believe I had a better soil though at 700 feet than I have at 3,000 feet.

CHAIRMAN: That appears to be the end of the discussion. I will now call upon Mr. P. H. Moore of the Agassiz Farm, Agassiz, B.C., to address you. (Applause.)

MR. MOORE: Mr. Chairman, Ladies and Gentlemen,—Everybody has said that they are pleased to be here, but a great many people have seen me here and they, with those who don't know me, probably think I am pleased to be here and enjoying myself, but I must confess that for the next twenty minutes I am afraid I will not be enjoying myself.

My subject will probably be of some interest to some of you, although this is a fruit growing, mixed farming and irrigated country. I will not take a great deal of time. If you can stand five or ten minutes for discussion afterwards, I can pro-

bably do a little better that way than by direct address. The subject I will address you on briefly is—

BUILDING UP A DAIRY HERD

Now, start out with a mixed bunch and take some of them off the range, possibly, for we must start from the bottom. I might talk things that you may think is twaddle at the moment, but when you go into the dairy business you will come to think and be glad you did. In grading up a dairy herd, I mean to start with the common or ordinary variety of cow such as you will find in a district like this. There are several kinds of that type where the breeding has been done indiscriminately and we have scrub cattle. You will be led after seeing the progeny of these cattle to think that they are here just to marry and inter-marry. If you can say there is any breed in some of those scrub cattle we have to buy to start our dairy herd with, I would like to have it named. Grading up a dairy herd may be applied to this kind of cattle, however, as well as pure bred. Every breeder has to start with what he can buy and when he pays he certainly does not buy the very best the dealer has and he has got to grade up. The term as generally accepted means the improving of the grade or scrub cow.

To make matters short, I think we will take it under three headings. I have really got about twenty-five, but we will start with the minimum of breeding to get your animals and feeding to carry on your breeding and selection. I will just touch upon those three headings and give you a chance to ask me some questions afterwards.

BREEDING

If you start on breeding operations of this kind, it is no mean task for a young man like me to stand up and state that I can teach older men, for that is some presumption. However, there has been such strides made in the matter of improving the breeding of both grade and pure bred cattle that one who has had some experience in that line is wiser than the older man starting in to-day; although he may be older he can learn a lot. The man who goes into dairying should like animals. It is no use going in unless you do like animals. If you are not in sympathy with animals you will have to stay with fruit farming and mixed farming in a way without this live stock, because we have seen men with money and men without money right in this province of ours, start in on this game of breeding up a pure bred or grade herd and fall down simply because somebody said that stock was the whole thing and they went into the game and fell down, because they had no perseverance and did not understand animals. You take an old breeder, middle-aged or old, if he has made a success of it his name "man" is spelled with a capital "M" and in some portions of the country where the fair sex have taken hold of it, it is spelled with a capital "W." I am not going to start any discussions just now of breed, because I look too young. If I were starting in this district as a greenhorn I would cast about to see who were the most successful breeders in the community and if there were any preponderance of one breed I think I would be justified in thinking that was the best breed for that district. Some have said, "I will try another breed and go in for competition."

That is wrong. You have enough competition in other lines, but competition in the same line is going to be the best thing that happens in the sale of stock for breeding purposes because you have a district with a name. I cannot talk about the community breeding, because it is several lectures in itself. That is the right idea. Some men say, I cannot stand for a black and white cow or a Jersey, and so on, but if you are going in for it you will soon learn to like them if it is the most popular breed in the district because everybody will be talking about it and you will be able to compare your work.

SELECTION

After you have decided upon the breed, the selection of sire is the next move to make. If you have only ordinary or scrub cows of the pie-bald, flea-bitten type, you want as good a sire as the man who has a pure bred herd. It is doubly necessary in a grade herd. You will find that statement is absolutely correct. Every breeder who has preceded us for the last 75 to 100 years has proven that point. It is no light job to select a sire of repute and you know any of our honest breeders in this country will tell you they have made mistakes in that line themselves and therefore for the beginner I must say, although I admit that the young sire has his place and has to be grown and will oftentimes produce excellent stuff, yet the old bull is the one to go to. You have ten chances to one. You will have to take into consideration pedigree. In an old sire one can see his sons and daughters. We do not keep a bull for ornament or as one man said, "for a continual round of pleasure," for him. If you are buying an old bull you will see his progeny and know what you are going to get in the way of performance, type and style. You put him on to the grade herd and he will do for two years. You will have to have another one to put on to his daughters, but if he is then breeding good daughters do not sell him off to the butcher; trade him to a neighbour and then you can get him back again. Or, keep him for two years as an ornament and if he is not working he will not be an ornament that you will be ashamed of.

You can get it back to breed on to his grand-daughters. Some of the oldest and best breeders in the country have done that and now they would not part with the old bull for five thousand dollars. Some people say that is in-breeding. I do not think so. Some people write to me and tell me that they want a sire absolutely unrelated to the others. If you know an old bull is strong and good and is producing what is right, do not be afraid to put him on to his grand-daughters. That will work in an ordinary layman's hands. Do not be afraid to pay something for the bull. Look at the big prices the pure bred men pay. They are in a bigger game and handling more money than we do. When a man comes to me to buy a bull I offer him two. I say, "I do not want to sell that one to you because I think he is going to fail—daughter and grand-daughter are not very good. Here is one that is good." I take a book out and show him the record of his progeny and I tell him that I want three times as much for that one as I do the other one. He says, "The ordinary farmer is not able to pay that." That is the biggest mistake he makes. He cannot afford not to do it. Compare the cost at the end of five years of a cheap bull that won't get stock for you and you have raised 40 or 50 heifers from him costing money and labour and they are only producing 10 per cent more than their mothers. As to the off-spring of a good bull you have paid three times as much, for experience

has shown that the increase of the daughters over the mothers has been from 20 per cent to 30 per cent or an average of 25 per cent. Where is your cost considered to heifers producing like that? Where does it come out at after working 365 days in a year and only being 10 per cent better off than at the start, to say nothing of the lack of courage and spirit, and that means something in the breeding of dairy cattle?

I do not know that I mentioned it, but I think I inferred it indirectly, if you have the good bull stick to him and hold him as long as you can get cows from him, because there will be some way to use him and two good daughters will pay his keep in a year. If you have a poor bull, get rid of him and do not stick on the price and do not let sentiment enter into it. If you bought him off your best friend, get rid of him. If the family is a good one that the sire came from, keep it and stick to the family. If there are weaknesses and we find there is in almost all of them, get a family that will drive it out. Do not go to extremes, because it is impossible to make headway when crossing breeds to the extreme.

Professor MacDonald told a story once upon a time that will illustrate my view somewhat. He told of a man who was starting to breed with a Shorthorn herd and thought they were not giving enough milk, so he crossed them with Holstein; then to enrich the milk he used a Jersey bull; to give them more hardiness he used an Ayrshire; to get rid of the horns he used an Aberdeen Angus; to increase their grazing qualities he used a Hereford; to get a little better colour of milk he used a Guernsey; to get a larger coat of hair and make them tougher he used a Galloway; and, to top it all, to make them more active he used a Texas Longhorn and in the end, all he did get was speed, which, in these days of motor bikes and cheap motor cars was not worth a hang. (Laughter.)

Keep away from that game. You can do without Shorthorn-Hereford crosses.

FEEDING

The next most important point is the feeding. Poor breeding and poor feeding are responsible for more low producing cows in America to-day than anything else and poor feeding is the worst. We know of millionaires in this province who bought good stock to show their friends, because they did not know anything about it. They did not have the knowledge about feeding and so got very poor breeds. I cannot go very much into the details of feeding, but you know if you have been in the business that there is no way to get so poor in the business as to half feed the cattle. You have not a hundred to one shot in getting success if you do it that way. It is a whole story in itself. I could not go into the details here, but one of the most important things with a dairy animal is to give it a start in life. I think I will just say something about calf feeding or what might help to bring the cattle to 2½ years in better form than ordinarily. I would like to speak of my own work in the way of a few government feeding trials. The one thing is to get them to size and usefulness at 2½ years. When born it is a young mammal and must have care and attention. It is no use to take it to the back of the stable and tie it to a rope where it has all that the other cattle have not. It should not be put in a vile smelling place and only fed two days. I do not believe in the practice of allowing the calf to stay with the mother a long while. Generally it can have a drink at first. The breed I worked with will drink when three hours old, providing it has not nursed. If the calf is at

all delicate let it have the food it needs and that is the first milk taken from the cow. There are certain fluids in that milk that is required to give it a start for the first few days. In my work I have found it better to feed them with milk for two weeks and give it to them out of a clean pail. It does not take long to clean the milk pails and you must remember that the young calf has been in a clean place before it was born and it is not accustomed to having dirt in its stomach and its stomach is not as strong as it might be and they get the scours quick enough anyway. The calf once having a set-back does not come up to the others. A drink four or five times a day in a clean milk pail is worth all the buckets of dirty milk you can give him. In about three weeks time the calf is quite husky if he has a clean room. About that time he will begin to nibble at the luscious alfalfa hay that you have here. He will also take a mixture of oats and bran and oil cake, and will take to it earlier and do better on it. A little box at the corner of the stable will do it a lot of good and a couple of spoonsful will start them. Whenever you see them eat more than a handful, give them skimmed milk and when you give them skimmed milk take out the whole milk. Recent investigations have brought out, and they are not yet completed, that there is something in butter fats to produce growth in young mammals. We have usually looked at it from the point of energy and production on the mammal. In that milk there is something that is far better than vegetable fat. But, when a mammal gets to a certain age, there is always a very infinitesimal butter fat in the skimmed milk that you cannot replace with vegetable fats. We have made experiments in this line for three years and we are finding it pays to feed three times a day to calves up to six months old. You must remember that the little calf at two feeds a day has to consume enough at one time to last twelve hours as a rule and that is the way they are usually brought up. We believe in feeding three times a day and feeding a smaller amount. I am sorry I have not the figures with me to show the records of feeding twice, three times and four times a day. The difference in the look of the calf was enough to convince one. Labour amounted to twenty minutes a day at two and three times a day, to weigh all the food, the milk included, to feed the calves, and wash the pails over for nine calves. It did not amount to much and anybody, whether they knew stock or not, when they came into the stable and saw the calves that were being fed three times a day, would say, "What happened to these calves?" It was certainly worth the trouble. In a few months under those conditions the yearling is possibly able to go to the range and rustle for itself. On the small dairy farm on the Coast it cannot do that. If bred in the fall it goes to the grass in the spring and looks out for itself in the summer. The next winter is the time it needs care and feed. A tough yearling heifer does not worry much about the accommodation in the hotel you put her in as long as she is dry and can grow a good coat of hair and has enough to put in her stomach, but they want exactly what you can grow here. They want roughage and a small amount of corn and mangels and a certain amount of sugar beet tops and corn silage. Even if her hair is four inches long, she does not mind it and will do well, and you have not the expensive cost of housing to put against her.

As a two-year-old, you have to begin figuring on production. As far as we have gone with early and late producing, we have not gone far enough to prove anything conclusively. We are, however, making better money out of those bred at 2½ years old. You get returns quicker the other way, but I do not think you make anything

more. At 2½ years it gives you a well-bred cow, and one you can sell for more money and will give you strong off-spring, and in the third year has a better chance of going stronger than the one that has been producing longer.

In reference to the food of the producing cow, you will have your own methods of feeding. This, of course, depends upon the country. A cow that is giving twenty-five pounds of milk of a decent butter fat percentage at all is doing hard labour. You would not think of driving a horse on the road at hard labour or working in the fields without feeding it accordingly. So, do not expect to have your cows producing milk well, because that is hard labour, unless you are feeding them well. Their labour is right at home, and non-spectacular work, and they should be fed with foods that go towards making milk, because it is different from the making of muscle. You should give them succulent food; they should have it because the milk they produce is a liquid material. You should have ash and you have that in your corns and alfalfa and to a certain extent in all the other crops and you have to get the carbohydrates to keep up the energy which you get from the silos. By all means consider a cow as a working animal and give her enough food. The days of getting something for nothing are almost over.

I must cut my address a little bit short, I see. After the man who says there is no profit in this dairy industry comes the main bump. You have to admit that you have to feed intelligently and breed intelligently and yet it is not done and you will, I think, admit it is poor business, and yet few of us like to be associated in a bad business. Why should a person plead ignorance in these days when we have been making such strides in the way of agricultural publicity? Look at the colleges, lectures, agricultural books, and demonstration farms on every hand for our use. We can get advice and help and everything simply for the asking. It must be the fault of the man, and if it is it must be due to the special characteristic in the man which is the same in the mule. That is one of the things we must contend with in our work at the present time.

One of the most important and one of the most neglected phases that I can mention in the three that link us with success, breeding, feeding and selection, is this selection. You cannot select from a dairy herd unless you know what you are selecting for. You can select from type, and the better type it is the better for our herd. But you have to select for profit. There are a good many surprises sprung upon the people who go into dairying. We have tested for men in our country and they have got some surprises; some that they thought were no good turned out better than they ever expected. In the breeding up of a dairy herd one must get down to the systematic way of knowing how he is going to get the best returns. We should use our lead pencils, as Mr. Strachan says, a little more than we are doing. It is better than paying for labour at 20 cents an hour. We cannot make a success of breeding up a dairy herd unless we do use intelligence. We have breeding associations; provincial governments are encouraging it. Dominion governments are encouraging it. You can get milk sheets and all instructions and a personal visit as well will also be made to you. We must get down to these things. We are not all going to fall right side up. We must get down and do the testing ourselves by getting into a testing association. A set of scales and a Babcock tester will do it. Any person can learn it in half an hour. It will take longer at the start. The governments are supplying the milk sheets and they are not going out very fast

either. To do this business properly you must know what your animals are giving you and it does not take much labour. The taking of samples from cows takes about two minutes per cow per day. A lot of dairymen will take more time to fill their pipes than do that and there will be more pleasure in testing in that time than smoking your pipe and you will find that out if you will go into it for a few years.

Now, to give you an example. Mr. Strachan gave you an example of his best and poorest cows and he arrived at it this way. We have a herd of reasonable looking grade cows, some excellent looking by the way, to start with. I do not know anything about the original herd. They were black and white ordinary cows when I started there. I will just select two, not the best, but two that I happened to keep the daughters of and I have track of their grand-daughters. These cows are numbered 13 and 24, fairly good cows, worth probably $150 when landed at Agassiz, at least they could have been sold for that. Cow number 24, gave 4,450 lbs. of milk, tested 3.98 per cent, made 212.6 lbs. butter, total cost of feed $47.40. Cow number 13, good looking cow, but a bad number for a stableman, gave 7,123 lbs. of milk. She tested lower, 3.92 per cent. They said she was a skim milker. She gave, however, 292½ lbs. of butter and her feed cost $48.95. After that time they both had heifer calves and I raised them. The heifers finished up their first lactation period at 2½ years. The heifer from cow 24 was an improvement on the dam. In the first place she gave 5,715.2 pounds of milk and 238 pounds of butter. The heifer from cow 13 was raised in the same way and in the same pen and with the same care as the other and she gave 9,781 pounds of milk and 391 pounds of butter. Comparing profit, number 13 heifer gave $50 more profit. We would not have known that if I had not weighed and kept an accurate account of the feed. The heifer from cow 24 is going to the butcher shop and the heifer from cow 13 is being kept on. It is a dandy little one. Why? Because every one is taking an interest in it. The barn men know it is better than the other one. They have an interest in that calf that the other one could not possibly expect to get and that is where the whole thing hinges. You work up an interest and that interest helps you a lot. When you begin to know the mothers, daughters and grand-daughters and work up an interest in that way, they will go better. There is something that gives you a pride in your business, and you know this also that when you get a bat in the eye from the tail of a good cow it does not hurt as much as one from an old scrub cow that you have no use for. I was raised almost in a dairy barn and my interest has kept on growing ever since in things pertaining to the dairy barn. A trod-on toe or the switch in the eye does not hurt as much when you know the animal that you are feeding and getting the milk from. It is one of the best entertainments you can get to figure up what you are getting and how much money you are making and then be able to put the money in your pocket. When your neighbour comes to see you is it not worth while to be able to tell him what your cows are doing? It gives us an interest and a pride in our work to be able to give actual figures of the performance of our herd. It puts the dairyman who does so on a par with other business men in the world. When it comes to looking after a dairy herd as they should be looked after, the fellow who does look after them properly has the other fellows backed right off the map.

I see I have taken a little more time than I should, but when one tries to tell a little of what he knows about cows, he gets on a large subject. There is just one

Corn Crop (Irrigated)

little other thing I would like to say. You will find this; that breeding requires thought and patience. Before you start you have to get down and figure out your way. It is not much labour to do the breeding, but you must think about it. You must know the produce and the feeding necessary to get the fine stock. You must study feeding and the way it goes to the cows and the way the cows produce on it and then there is the labour connected with it. It is 365 days of labour each year. You have to do the selecting yourself and that is where the gentleman part of it comes in. All the rest is the hard work part of it. You will be a better citizen and save your labour if you follow diligently that system. (Applause.)

CHAIRMAN: Mr. Moore's talk is so interesting that he has infringed considerably upon our time, but I did not wish to stop him.

DELEGATE: Would you take the calf off the milk quick?

MR. MOORE: No, never. Just gradually. He will teach you how to do it. When he goes on to taking grain you cut down the milk so much. Do it gradually, that is the whole thing. He will begin to take his grain gradually and you should take off so much of the milk the same way.

DELEGATE: Do you say that if they had long hair they would not be so valuable, that is, through keeping them outside? Does it not cost more to produce the long hair?

MR. MOORE: That is a long argument. The housing of the calves will cost so much money and there are so many animals in a barn and they have to pay for it. You have to take into consideration disease and labour. If you put them into a good shed then this has to be taken and fitted into ordinary conditions. If you have a good shed that would cost about $2.50 an animal to build you should give him plenty of sunshine along with it and by doing that you will keep disease away.

DELEGATE: Is there any limit to the feed?

MR. MOORE: No, there is not. We just give them what grain, silage and roughage they will eat. We feed them full of that. We give the producing animals the cheapest mixture of grain we can get and we follow the markets for that, but we give them about one pound of grain for every 3½ pounds of milk they produce. I have fed two-year-old heifers that, but they had to pay for it. But with the ordinary producing cow you have to figure on every 3½ to 4 pounds of milk to one pound of grain. My herd of dairy cows last year did not eat a bit of hay from last summer until the present summer. They ate mangels and straw. Theoretically a pound of alfalfa of the second or third cutting is worth a pound of bran. It is not quite so practical, but even if not, you can see the advantage. It is something that has to come to you by study.

MR. MITCHELL: Might I ask as to feeding roots to cows?

MR. MOORE: It is better to feed them mixed. If you will feed after milking it will be better. Turnips you need not worry about, as you can grow mangels so well. If you feed other roots you have to fit that into your day's work. There is another side to it and that is you have a quieter animal if you milk before you feed. It generally fits into the time of the day better and you do not keep your man in the barn all night. Milking is of course generally done at night towards the last thing.

MR. STRACHAN: Do you warm the skimmed milk when feeding to the calves four or fives times a day or do you give it at the ordinary temperature?

MR. MOORE: No, we warm it. If you feed 1½ to 2 pounds per calf it does not take a large pail to hold it. Take a large can of hot water and set the pail in it. When we are feeding like that we are milking the mother oftener, and we feed the calf every time we milk the mother. When feeding the skimmed milk we just warm it up at nights.

MR. STRACHAN: Would you suggest the amount of mixture that would be the ideal pasture for the dairy cow where we can grow alfalfa. What would you suggest as an ideal mixture.

MR. MOORE: I am afraid that I cannot answer that question. I am working under such decidedly different conditions from what you are here. There are men in the building who could answer that better than I can, I believe. I feed out of the silo all the year round. I am sorry, but we all have our limits.

MR. WOODWARD: I have been asked to ask your opinion on pasteurized milk and ordinary fresh milk?

MR. MOORE: That is getting into an expert dairyman question, but I think the authorities will say that perfectly healthy raw milk is the best.

DR. TOLMIE: I endorse everything Mr. Moore has said. I may say that under the policy of the Dominion Government, where an association is formed, the government will place a bull there, that is, if there are ten or more members in that community. All they ask is that the farmers should lead the bull home and take care of him. We have just placed a bull in Pritchard in the same way to improve the breeds there.

With regard to the keeping of records. One of the most striking things I have ever met with happened in the state of New York. I visited a herd at Elmira in order to look over the World's Champion cow. It had just made the World's record producing 44 pounds of butter in seven days. At the end of a hundred days she had broken the record for 120 days.

In one herd of dairy cattle I saw in that vicinity was a three-year-old heifer that had broken the record for one hundred days. Here is the point I am getting at. There was a man who was breeding Jersey cattle. He fed and milked them well, but he was one of those men who could look into the pail of milk and tell how the cow was producing. He kept no weights or records of any kind. A breeder in looking around to introduce some fresh animals into his herd visited this dairyman's

place and looked over this three-year-old heifer; he saw that it looked good and purchased it for one hundred dollars; took her home and developed her into the record breaking heifer I was looking at. This breeder then went back and purchased the mother which was sixteen years old, and which also made a record in his hands. The point is this, had these cows remained in the dairyman's hands they would have remained one hundred dollar cows, but in the hands of an intelligent breeder they were worth thousands of dollars. In fact, in a letter to me recently, I am informed that in advertising and in the improvement of his dairy herds those cows are worth $25,000 to the present owner. To illustrate the importance of a sire. At a recent auction sale a breeder paid $25,000 for a bull. In the city of Detroit, a calf sired by the bull was sold recently for $20,000.

Mr. PRITCHARD: I would like to say a word about the association at Pritchard. We got the bull from the government, spoken of by Dr. Tolmie. It was of Ayrshire breed and I must say that I think Dr. Tolmie used very good judgment in selecting that bull for us.

CHAIRMAN: I would like to call on Mr. Brown, Chairman of the Local Board of Control, to read a resolution.

MR. BROWN: A little explanation may be necessary. When we heard that the Duke of Connaught was going West about the time we were holding this Irrigation Convention, I asked the Secretary to get in touch with him to have him address the association. We found we could not do this as he is not going back East until to-morrow morning when our convention would be over. Then Mr. Lawrence thought it would be a good idea to have him become a patron of this association. He wired him to that effect and received a wire from him that he would be pleased to become a patron. The Chairman has the telegram and the answer received. I would now like to move that this association meet at the station to-morrow morning and that Senator Bostock present him with a badge as a member of this association.

MR. AULD: I would like to second that motion as it would be an honour to have the name of His Royal Highness associated with this association.

CHAIRMAN: You have heard the motion made by Mr. Brown and seconded by Mr. Auld, Deputy Minister of Agriculture for Saskatchewan. The telegram received from His Royal Highness reads:

> "Your telegram 25th. His Royal Highness will be very pleased to become patron of Western Canada Irrigation Association, and will be pleased to meet deputation of association at Kamloops station on Friday morning, July 28th. Please, however, remember that His Royal Highness' stay at Kamloops is only ten or twelve minutes."

You will notice that there is a hint to us at the conclusion of the telegram to do things expeditiously. I will, therefore, put the motion to the association and ask them to adopt it by a standing vote.

Motion carried.

MR. WOODWARD: At what time in the morning?

MR. BROWN: The train will arrive here at 8.30 in the morning.

CHAIRMAN: I will now call upon Mr. Fryberger to address the convention.

MR. FRYBERGER: Mr. Chairman, Ladies and Gentlemen,—I was in hopes that I would be allowed to stand down below to say what I have to say at this time because I was afraid of an attack of stage fright. If you will notice the names on the programme you will see that my name is the only one that appears without a handle to it. All the others are so and so, and it is stated what position they hold, but I am a plain farmer. There are two kinds of farmers. The farmer who farms the farmer and the one who farms the land. I am the chap who farms the land. After hearing the discourses of the many speakers of the estimation in which farmers are now held, it makes me feel gratified indeed that I am a farmer. It makes me believe that I belong to a class that is as good as any one else so long as we behave ourselves. I am very pleased indeed to have met you and I may say there are some things in Kamloops that I would like to take back with me. I have, however, many pleasant recollections to take away.

The subject assigned to me is one that will not interest many of you. Perhaps it would be well to tell you where the community I live in is, namely, Bassano Colony, and how it was organized. Bassano Colony is in the extreme western end of the Eastern Division of the Canadian Pacific Railway Irrigation Block. It lies about midway between the Bow river and the Red Deer river and on an average about eighteen miles from Bassano. It was settled two years ago last spring by a number of farmers who came from the state of Colorado. They all have had from five to twenty years' experience in irrigation. They came up here under rather auspicious circumstances and I would like to tell you the notoriety we created for ourselves on our journey. These people were gotten out of the Arkansas valley and the people and the railway in Arkansas resented the idea of these farmers leaving. In fact it was resented so much that the Sante Fe Railway refused at one time to give us cars to come up to Canada in. There was, however, some pressure brought to bear on them and finally they agreed to give us cars and they gave us sixteen automobiles fifty-foot cars, to bring our effects in. They also gave us coaches to transport our people to Kansas city. We then came over the Chicago North-Western to St. Paul from Kansas City to St. Paul. We were running on schedule time and in that distance three engines played out on us. At one time when one of the engines played out they had to put on a construction engine and that brought us along. When we landed in St. Paul the Canadian Pacific Railway kindly put on two tourist coaches and the families all came along with the trains. Our stock was loaded in the train at Colley, Colorado, and it was never taken off until we got to Bassano. They did not even stop us at the line. I suppose they were so glad to get us out of the country down there. However, we are there and we are going to work to make homes for ourselves there. We originally had twenty-three families and they are all there yet with the exception of one. We now have fifty-two families in that colony with a population of 237 souls.

Last year we raised a little better than 300,000 bushels of grain and this year we hope to increase that by about 50,000 bushels.

As to the varieties of crops. We have only been there a short time and have not had much time to experiment. The first thing that concerns an immigrant is some way to make a living and as a matter of fact he has not much time to experiment. I will just mention these things and you will pardon me if I refer to my own experiments, because I happen to know more about my own business than about any one else's, which may appear strange. We raise wheat, oats, barley and speltz. These are not the crops that you will find in the Canadian Pacific Railway Company's literature setting out the kind of crops you can raise, but those are things we have tried and know we can grow successfully. Speltz, rye, corn, kaffir corn, millet, field peas, sugar beets, mangels, rutabagas, timothy and alfalfa. Just a word about wheat and this will also apply to the other grains. There is the matter of maturing wheat under irrigation. The opponents to irrigation in our section say that irrigating wheat in a dry year is all right, but if you irrigate it when it happens to be a wet year, you will not mature it. While we had a great deal of experience with irrigation, we found we had a lot to learn about the climatic conditions where we are located. In 1914 in our section at least, it was very dry. There was nothing at all good and one of the best dry farmers in our section had oats which averaged him two bushels to the acre, so you may know how dry farming fared in that year. Water had never been turned into the canal until that year and the company was not able to get water to us until the first of May, consequently it was too late to get very good results. However, a number of us who tried, got considerable water on our ground and we had fairly good crops. I will tell you of an instance as to the reason why wheat would not mature with irrigation. This is an old story to Mr. Fairfield as he has experimented with the same thing. I might mention that these reports which are gotten out by government men do not seem to have the same effect until some common farmer has the same thing happen to him. I must say, however, that Mr. Fairfield's reports have always been of great benefit to me and if any one follows his advice they will not go very far wrong. In this case I had wheat on summer-fallow and I thought I would grow it without water. In watering some other crops some waste water got down over this particular field and that was about the 1st of June when it ran over and I suppose it watered ten acres. I went ahead and watered the rest of my farm and about the 22nd of June I found that the wheat that had caught the waste water was about four or five inches higher than the rest of it. It was a good healthy grain, some thought it was yellow. The other looked so blue that they thought it was yellow, but I found where I had not got any waste water on, the wheat was actually dying and I made up my mind that I would rather have a good field of grain than nothing so we watered it really twice in that part about the 1st of June and the 22nd of June. After it was watered the second time it grew and matured and was about the best I had that year. The wheat that had not been watered until the 22nd of June grew, but it took the second growth and it never did ripen. The other wheat I let stand so long that the wind threshed it out, whilst waiting for the other wheat to ripen. I know it took the second growth because in many places the gophers had eaten off this grain and when I watered it, it came up as good as where the gophers had not eaten it off. It struck me that the reason many people thought you could not mature wheat crops with irrigation was because they put it in with a view to growing it without irrigation and they would say, "if it does not rain soon, I will irrigate." The crop, therefore, suffers and does not continue to grow, but takes

on a second growth. The tendency is, in a country where we have almost enough rainfall, to do this thing. This year I did the same thing, but I am satisfied if I had made my ditches as soon as I had sown my wheat and three weeks ago had good irrigation on, I would have increased my crop three or four bushels to the acre. We find it absolutely safe to water our wheat up to the 15th of July, providing you have kept it growing all the time. The same thing applies to potatoes as well as to grain. You must not deprive a crop of wheat of moisture and then put a lot of water on it, and expect it to grow as if the moisture was always there. Now, I have some experience with speltz. Perhaps some of you don't know what that is. We used to call it speltz in Colorado. I find it to be a rather good grain so two years ago I sent to Winnipeg and got two and one-half bushels of seed. I grew it under irrigation from seed. From that two and one-half bushels I grew 105 bushels. I brought some of the seed up to the International Irrigation Congress and the Canadian Pacific Railway took some of it to San Francisco and Mr. Rankin tells me I took first prize with it. I have not seen the medal yet, but I think it exists somewhere. Last year I got 2,300 bushels. I would like to tell you what I did with hogs on this. We consider it equal pound for pound with barley. It yields more than barley and we think it is better. I sold five hundred bushels this year to the McKenzie Seed Company for seed.

Of course root crops have been largely explained and you were told how to handle them with irrigation. We believe that we can grow as good potatoes in Alberta as you can in British Columbia. This is what we are going to do in Alberta. We are going to change the market value of potatoes over there. Heretofore you go into a store and ask for potatoes and they will say, "Here are some B.C.'s at such and such a price, and here are some Alberta—much cheaper." We are going to change those conditions under irrigation. We believe we can grow better potatoes in Alberta than any other place in the world. (Applause.) If you take Mr. Fairfield's report you will see that he has had very good results. There is another thing that benefits us that you probably do not get here. That is regarding our so-called high priced land. When in Colorado we did not think that $50 an acre was too high a price for land because there it sells for from $150 to $250 and many men on that land have been renting for $500 to $1,000 a quarter. It makes us smile to hear people say that $50 is exhorbitant for irrigated land. However, it is all in the way you look at it. We cannot afford to pay that and summer-fallow it, which is the only system without irrigation. We have to get results in other ways from the land and we believe that potatoes and sugar beets are the solution of the problem. They might tell you that sugar beets will depreciate the soil, and, of course, potatoes do. I have heard men say that if you raise sugar beets for a while you will destroy the fertility of the land. The best crops I grew in my life were crops that followed sugar beets. This year we have grown on potato ground grain crops that are magnificent. Last year a neighbour had potato ground in wheat and he got a fraction better than 70 bushels to the acre. We believe even if we do not make a big profit off potatoes it will take the place of summer-fallow, and consequently it will be of value to us.

Just a word about sugar beets. I really feel afraid to say anything about them, because it may be like touching a match to a powder magazine. Yesterday in going to the Sanatorium we passed land that looked ideal to me. I just thought if I had a farm in this nice flat over here and plenty of water, I would feel that I had

the world by the tail. I believe it would grow immense sugar beets. With us we believe we have the climate, the soil and the water. We have been making some experiments with sugar beets. Last year the company sent some beets we grew to Billings, Montana, and I believe the figures are in the office; they tested 20 per cent. That is very high as you know. We cannot all hope to raise a crop that will test that high in saccharine. We possibly cannot grow them to the same advantage as we grew them in the southern country, but we grow a richer beet and the matter of labour is, of course, a very serious problem, and one that I have been thinking considerable about since last night. I see that in the provinces of Alberta and Saskatchewan they are calling for two thousand harvest hands and the thought just struck me this way, if we had eight or ten thousand acres of sugar beets in there and a lot of labour there to thin and hoe the land by the time the harvest came on that would be done before the labour was utilized for the harvest. It would be a mighty good thing if we had that labour to rely upon and then we could use it for the grain harvest. I am sure we could use these labourers from the 1st of July until it froze up every year and I am satisfied in my own mind that the problem can be worked out satisfactorily. The problem is as to whether we can grow sugar beets in large enough quantities and quality. Then there is the frost. Frost that would injure a grain crop would not hurt sugar beets at all. They are also immune from hail. It, of course, sets them back, but it does not ruin them and it works in with the general idea of mixed farming as good as any crop that you can grow. In a well regulated 160 acre farm you can grow from ten to twenty tons of sugar beets with practically the same farm labour and the same equipment, except that you would have to have a deep cultivator. Of course, they plant more rows at a time also. Then there is the labour, outside of the thinning and the topping. The by-products will more than pay for the difference even if it is high. I believe we can also grow the seed. I believe that is all I have to say. If there are any questions I can answer on the subject of sugar beets, I will be glad to do so.

DELEGATE: I would like to ask you if irrigation in the fall will do well for wheat?

MR. FRYBERGER: In our section of the country, we have practically no subsoil—it is all soil. I have personally dug down ten or fifteen feet. I want to give you a little experience about that. The first year I dug a root cellar 16 x 30 feet—just a hole dug out by a team. That trench was dug east and west and the next year it laid without covering. Some grains of oats and barley got into the trench and they came up and grew apparently as well as the grain above them in the field. The soil extends down to the quicksand—so the well drillers say—which ranges from thirty to forty feet. With fall irrigation that is the ideal condition. There are several things that enter in that. The first thing is to get your ploughing done before the water is shut off from the ditch. That is the proper condition especially for wheat, because you have to sow your wheat in the spring before the water comes down and if you have sufficient moisture that will bring the wheat to the point where it comes up. If you have not sufficient rainfall to bring it up sow your wheat and water immediately and harrow as quickly as you can get on the ground.

MR. WOODWARD: I believe Mr. Fryberger said something about going into irrigation more extensively. He says he got a first prize. If he goes into irrigation he will find that there is more in the application of water than he is aware of. I have irrigated since 1878, within one hundred miles of Kamloops. The summer of 1878, I first had my attempt at irrigation as a lad. Of course, I did not know anything about it. I had to rely upon my observation and battle through with the water because I did not know anything about its application. In irrigation you have to know your ground, the quality and output of your ground. Then there is the germination of the seed. If there is not sufficient water in the soil to germinate the seed, why you must irrigate. Then again the kind of ditches you have to put in to get the best results. In my experience different kinds of soils take different ditches. On a light, loose, open soil, it is better to put in a shallow ditch. You will irrigate with less water and much faster. On a clay soil, especially where there is alkali, it is best to put in a deep ditch as deep as you can do it so long as it does not interfere with your machinery. The reason for that is that the water will not go down in a clay soil, it will lie on the top of the ground and moisture will evaporate and, another thing, it will have the tendency to bake, and the nearer to the surface the moisture is, the quicker it will bake. By putting your water lower in the ground it will sub-irrigate and in cases where there is alkali, I notice if you do not put too much water on, the surface will look dry but if you dig down you will find it quite moist. Then the next is the particular kind of grain crop and that is after the grain stools, but you will notice that in wheat there is always three or four stalks grow faster than the rest. I don't know that many people have taken much notice of this, but I find that on wheat the average number of stalks that will grow from a grain of wheat is seven. If you only get four that are going to grow up the moisture is not sufficient to get it to grow properly and you are going to lose on that. Now you give the water at that time and these small suckers as we call them will shoot and grow faster than the large ones and will catch up by the time the grain is ready to cut, so at that rate you will get a better yield. The next irrigation is for quality. Now you irrigate when the grain is in the milk and you will get a better quality of grain than you will later on. If you irrigate in the milk your grain will be harder; if you irrigate when it is in the dough your grain will have a larger grain no doubt, but it will be softer and the results are that when you turn it into the mill, the hard grain will give more to the acre. The quality of the grain depends upon the milling quality of the grain. If the grain is large there is not so much flour in it as in the small grain irrigated in the milk, because that grain is fuller; then again, there is not so much bran on the hard grain as there is on the softer grain. In irrigating these are two of the principal points to look after with wheat. With other grains it does not matter so much.

CHAIRMAN: We will now adjourn until 2 p.m.

THURSDAY AFTERNOON SESSION, JULY 27, 1916

CHAIRMAN (after calling the meeting to order): I will now call upon Mr. R. M. Winslow, Provincial Horticulturist and Inspector of Fruit Pests, to address you on

APPLE ORCHARDING UNDER IRRIGATION

MR. WINSLOW: Mr. Chairman, Ladies and Gentlemen,—Apple Orcharding under Irrigation is a very big subject, and I do not know how successfully I am going to cover it. I did not expect that there would be many people here to-day who are interested in orchard work itself and quite a bit of the talk I have prepared is more along the general aspects of it. However, I think I will at least open up the practical side of the business; then it will be up to you to draw that side out.

The apple business here is, of course, a fairly young industry. At the end of 1915 we had about 3,000,000 fruit trees in this province, and of those, 2,300,000 were apples. Until fifteen years ago, in 1901, we only had 435,000 apple trees, showing an increase of about 350 per cent in fifteen years. Of the acreage we have at present of fruit trees, 77 per cent are apples. That is, our fruit industry is approximately three-quarters an apple industry and I believe that the proportion will continue at about that rate or that the percentage of apples and apple production will be greater as time goes on. In 1901 about two-thirds of the apple trees of this province were in the non-irrigated district. In 1915 approximately about 70 per cent of the apples are in irrigated districts; that is, a great part of the expansion of the apple industry has been under irrigation.

With regard to the production, of course the heavy planting of apples took place about ten or thirteen years ago, most largely in 1903 and 1908. There was not much increase in the apple shipments of the province until 1910, and in that year they only amounted to 350 cars. In 1912 it increased to 716 cars of commercial product. In 1914 it increased to 795; in 1915 to 1,537 cars. The increase in the years 1910 to 1915 was 340 per cent in apple production.

At the present time 40 per cent of our apple trees are not bearing. On the same basis of production as in 1915, our apple trees in 1920 will be producing about 3,800 carloads. When we consider it in a general way, we say 3,500. Of the acreage in 1915 about 70 per cent was in irrigation and about 30 per cent was not irrigated. By 1920 I am quite safe in saying that about 85 per cent of our apples will have been produced under irrigation conditions.

There has been a great change in the development of the apple industry. It has not advanced very much in the humid regions, except in some regions in the interior, but has made its greatest development under irrigation. The reasons why the apple industry has rapidly gotten into the irrigation district I will briefly mention to you. First of all has been the development of irrigation systems. The irrigation projects of the interior are well known to some at least of you, and it has been the systematic colonization of those projects which fostered the tremendous increase in the apple acreage in the interior. Another thing is that, whereas on the coast and other sections the apple industry is more or less an adjunct to every farm, in the early time those who came here did so primarily to go into

fruit or orchard cultivation and with the other lines of agriculture as side lines. The primary reason for many of the people coming into British Columbia was to engage in orcharding, and the great majority of them have kept to that intention. Another factor that helped to develop orcharding under irrigation is the fact that these irrigation areas are fairly compact and closely settled communities, and that has resulted in greater profits from the business. The man on the land has been able to exchange notes with his neighbour and there has been more or less of a feeling amongst the apple growers that co-operation in efforts brings better results than individual effort and there is every reason for the people to stand together. That feeling has helped a great deal to help the orchards planted under these irrigation projects. Another factor which has helped orcharding under irrigation conditions has been the great proportion of the soils of the irrigation districts being well suited to apple culture. I need hardly say, of course, that the fruit produced under irrigation or that the apples produced under irrigation are usually of a higher colour and better finish and freer from insect pests and malformations than apples grown under humid conditions. One of the most trying things in humid areas is apple scabs, which in the dry districts is unknown. In Vernon and other parts of the irrigated section the rainfall has been unusually heavy and therefore apple scab has been quite serious under irrigation. Another factor is the increasing of the yield under irrigation. As a rule apple trees bear heavier there than they do in the humid areas. Finally, and in this I have reference particularly to commercial production, it is much easier to organize market facilities than it is in the orchards scattered in the humid areas. Now, those factors all help to explain the preponderating development under irrigation conditions and they may also be taken in consideration in comparing the irrigation districts with the humid districts and absolutely by themselves as the reasons why our apple industry is drifting more and more into the dry belt. Now, against [those favourable conditions there are a good many difficulties and at quite a number of times in the past few years our areas have been reduced pretty close to disappearance. Of course, I am often accused of being a pessimist. As a matter of fact, my position exists because the fruit grower has trouble and my efforts lend themselves by government assistance. However, I am more closely associated with the fruit growers' troubles than with their successes. I suppose you always notice that if a man puts a thousand dollars in the bank at the end of the year's operations, you do not hear so much about him as you would if he had to go to the bank at the end of the year and get a thousand dollars.

Amongst those problems I thought I would classify my subject under eighteen or twenty different headings, but I do not think I will now do that as it would weary you too much.

There is one very big question and one that appeals to me almost more than any other question under dry belt conditions. There is no soil in the world that will not wear out and after all heavy crops of fruit make as great demands upon the soil as any other crop which is or can be grown, but there has been special difficulty connected with the fertility of those soils that makes it a subject of importance. As you all know, or at any rate believe, we started off in the dry belt with a high percentage of mineral salts in the soil. Under irrigation, soils of that character

become very fertile indeed. Through all the centuries there have been accumulations of potash and lime, and all those mineral constituents are realized under irrigation. That is, in the first few years under irrigation there is a large percentage of those constituents available. Further, despite the fact that the dry belt soil is very low in humus, it must be remembered that humus soils hold valuable nitrogen and humus soils therefore while of a low percentage of nitrogen, when brought under cultivation, that nitrogen is available. It can be seen therefore that our dry belt soils, when brought under cultivation, possess high fertility. Further, all of you know that a young fruit tree not bearing fruit heavily makes comparatively small demands upon the soils and so that during the first six or seven years of growth of our apple trees, the problem has not been to get growth, it has been to keep it down. However, conditions change. It is soon possible to exhaust the readily available humus in the soil. Under irrigation there is the leaching which seems inevitable with irrigation in the dry belt and when on top of that the orchard comes into bearing at six or eight or nine years, there is a heavy drain made upon the fertility of our soils.

Down in Washington, in the Wenatchee and Yakima valleys, they are a few years ahead of us. They faced, a few years ago, the problem of reduced yields, reduced growth and that yellowing of the foliage which denotes impoverishment of the soil. I visited those districts and I saw that the fruit growers in the district were very much concerned indeed with the problem of keeping up the fertility of the soils of their apple orchard. Now this exhaustion is bound to come. There was a big mine of fertility in those soils to start with but it was taken out at a rapid rate. The usual reply is the application of barn yard manure, but in our districts and the districts across the line, the great percentage of land under irrigation is devoted to orcharding and very little land is devoted as a rule to alfalfa and other crops for stock feeding. The problem of obtaining barn yard manure is an acute one in the dry belt.

We have just been getting up against this question of fertility in the last few years in a general way. The problem becomes acute at first naturally on the lightest soil where, in conjunction with the lightness of the soil they have had fairly heavy crops of fruit. By the way, an average crop of apples takes as much fertility from the soil as a good crop of wheat and the man who takes off a good crop of apples every year for four or five years faces the same proposition as the man who takes off good crops of wheat for four or five years.

In the Wenatchee country a number of the apple growers had tried alfalfa in their orchards. One of the most intelligent men and a grower down there told me that despite large applications of barn yard manure on his orchard the men who had alfalfa in their orchards were producing more fruit and on the whole a better quality of fruit than those who had fairly ample supplies of barn yard manure. A number of our growers are now experimenting with alfalfa. This has been going on now in a general way for two or three years. There is a great deal more to be learned from it in practice than by theory. Down in the Okanagan valley I have seen a great many cases already where young orchards have been destroyed by alfalfa being sown between the trees and carelessly handled. I have also seen where alfalfa grown between the trees has brought undesirable results despite every effort on the part of the owner to give the trees a fair chance. That is where he cut

the alfalfa and let it rot on the ground to supply fertility and gave an ample supply of water for both trees and alfalfa. On the other hand, a number of our orchards, some of them most productive, are now in alfalfa and have been for some time, and are apparently giving better results than they did previously under clean cultivation. It is yet too early for anyone to say, except in the most general way, just where alfalfa can be used in the orchard to advantage and where it cannot, but as a rule I would say that alfalfa sown all through the orchard is not likely to be a success unless the soil is reasonably deep and a reasonably strong soil and there is sufficient supply of water for both trees and alfalfa, and the owner is reasonable about it and does not insist upon taking three crops of hay out of the orchard without a return.

In the last few years, especially on the orchards which were planted from 1904 to 1907, returns have not been high. The average yield of fruit per acre has not been anywhere up to the expectations of the growers, and financial conditions have been bad. This has discouraged men on ten-acre lots, especially where they do not own horses themselves to put their orchard down in clover and grasses and pay a man to come in and cut the hay and haul it off. Under those circumstances, orchards have gone back very rapidly. In other cases the orchards have withstood it very well.

On a practical basis, I have not any recommendations which can be made at a meeting of this kind. In any particular orchard, knowing the water supply, the soil and the condition of trees and the man who is handling it, a man can say with some certainty what will be the results under different methods of cropping the orchard, as to alfalfa, clover or hay, but from the platform here, on the whole it is safest for me to say that it is a thing to go very cautiously about.

Some of our growers are meeting the soil fertility question and soil economy question by having orchards in alfalfa or hay and feeding it to a few cows and also at the same time running a few hogs. In one case I know of a man who is still producing excellent crops of fruit on a ten-acre block of land and at the same time is supplying the bulk of the feed for two horses and a cow, and he also keeps a hog or two. I really did not think that ten acres would do all those things fairly well, but he seems satisfied with his results.

There is another question of greater concern in the dry belt of British Columbia than it is anywhere else in the province to my mind, and that is the question of winter injury or frost injury to our trees. As a general observation, it might be stated that our interior districts are freer from blossom killing frosts than most districts. The amount of injury from spring frosts to fruit is very limited, but the amount of winter injury is high. In fact, winter injury has caused far more loss here than all the pests and bugs we have had, and I sometimes think, more than we are likely to have.

Winter injury has been serious only twice in the last twelve years. Once in the winter of 1908-9, when we lost a large proportion of our peach trees, and then the winter just passed (1915-16) which has been very severe on apple trees. This last winter injury has not been true to form. Varieties which seemed to be amongst the hardiest have suffered more than others supposed to be less hardy, and which from past experiments seemed to be more delicate. The only observation I can make from this platform is to say that the past winter has shown that orchards cannot be neglected with impunity. Any orchard which showed a soil with lack of fertility,

lack of cultivation and other deficiences, has shown more suffering. At the same time there has been a large percentage, in fact, of less fairly hardy varieties well cared for and under as favourable conditions as we could have that did not seem to have suffered. The only general recommendation on winter injury that one can make is, as I have stated, always realizing that if we have winters as we had last year, it means re-organization of our apple industry.

Another problem which comes very largely from the newness of the district is the question of suitable varieties. All of you have thought in Canada the problem is to find winter varieties of apples, hardy enough to stand our winter climate and yet be fruits of sufficient colour and flavour as to be favourable to our markets. There is one very interesting thing in this connection in which you might be interested. As most of you know, the most satisfactory apple in our district is the McIntosh Red, that originated in Canada and has been favoured in the East and in the West. We have just concluded a five-year study of the cold storage qualities of the principal apples of British Columbia from all the important districts. One of the most interesting deductions we have been able to derive from it is that McIntosh Red becomes with proper handling one of the most superior of cold storage apples. We have in Victoria, McIntosh Reds in cold storage which are equal to any of our McIntosh Reds of last fall. The fact that the McIntosh Red was a cold storage apple was shown last year by the Dominion Government. It was shown at Victoria owing to the fact that we are so short on the long keeping varieties which our neighbours to the south are able to grow to better advantage.

One of the most discouraging things about the question of variety is the fact that few of our growers keep any records. This morning Mr. Moore gave valuable ideas on how to know what your individual cows are doing. I was in an orchard in Ontario which was fifty years old and I asked a man, born and raised there, what the yields had been on that orchard and very much to my surprise he said that in the fifty years of its history that orchard had not borne a crop of apples large enough to pay expenses, and when they saw how it was going they kept the expenses down. In California I was going over citrus groves and was shown groves that had been a source of study and investigation for twenty years in an effort to find out why those groves did not bear and could not be made to bear. Other groves quite near them were growing very well indeed.

Of course, our industry is very young, but there is practically no information to be had from the majority of our growers at the present time as to the relative production and capacity of the different varieties and I may safely say the same as to the bearing of individual trees. Of course, individual trees present a tremendous problem, but yet when a man is on ten acres of land and his production on ten acres of land could not be more than an ordinary income, that ten acres of land gives him an opportunity to get intimately acquainted with it. It is surprising and to me discouraging, that so few of our growers have kept any absolute records of yields of varieties, let alone of individual trees. Mr. Moore said this morning, further, that there were milk record cards and milk record sheets and full instructions of all those things for the milker, and for weighing and Babcock testing. The same is true in the fruit industry. We have tried to get fruit growers interested in keeping records, but so far have had only a small percentage of the fruit growers giving us a satisfactory record. There is a tremendous amount to be learned

of any individual block of Jonathans or McIntosh Reds and even if it is a block of twenty-five trees there is the opportunity to get better results by keeping a record. I have seen in one district here one very striking case. Twelve years ago they planted an orchard with double fillers, Transcendent Crabs being the double fillers. Those trees bore nothing for eight years. With the experience then gained, a block of Transcendent Crabs, five years old, was handled differently. These also were fillers and the object was to get all possible production out of them before they were taken out. In this case the owner was willing to take it over and, by a different method of handling, those Transcendents produced from the five-year-old four boxes to the tree and they bore only a like crop last year and this year they have a promise of five boxes of fruit, that is, those trees are averaging about ten boxes of apples before the others on the same soil had produced anything. Probably this is an extreme case but it shows with a little difference in handling you may make all the difference between an absolute failure and an absolute profit. I may say that in the first place those Transcendents, by the time they were nine years old, were so large that the problem was to get them pulled out at as low a contract price as possible.

You have said so much about the irrigation question and the problems it brings up, and I really do not think I could discuss anything about that with advantage. All of you who are acquainted with conditions here know that, as stated in the resolutions, the irrigation companies have found themselves face to face with unexpected difficulties and in those difficulties are involved the growers who relied absolutely upon the companies for water. However, in one way or another the companies have been able to get down a fairly adequate supply of water. In some cases certain municipalities, such as Penticton and Summerland, own their own water systems and are steadily year after year putting in more permanent works as funds are available and are gradually getting into fair shape. However, the irrigation problem is a big one.

Sometimes when I hear criticism from the markets both on the coast and the prairie as to the apple grower and the large profits which he must be receiving, I feel sorry and sometimes I cannot help seeing the humorous side of it. The apple and fruit grower generally has heavy problems on his side. On the economic side one question has been spoken of several times—that is, the problem of the ten-acre block. I know, and I suppose many of you know, ten-acre properties returning a satisfactory living to the owner. On the whole the ten-acre property has great drawbacks and especially if the average selling price of the product is run on a low level, the man on the ten-acre property will find himself in a difficult position. I know of one ten-acre block of orchard land down in Summerland which for the past three years has averaged the owner sales of over four thousand dollars, netting him, in fact, after allowing interest on the investment, something like two thousand dollars a year for his own labour. It shows certainly that the ten-acre proposition is not impossible, but the fact remains that for a great many of our people it has proved a difficult proposition. Consolidating small properties into large ones when money is scarce offers difficulty and very little progress is being made in that direction. Small areas certainly do handicap the owners in an effort to build up other lines of income. It especially handicaps them in an effort to get into stock without at the same time risking or injuring the value of the orchard.

One of the class of inner crops in one district which has obtained proportions is a class of tender vegetables, not grown to any extent at all in the prairie provinces. In some of our districts in British Columbia there was no production at all of tomatoes, cantaloupe, cucumbers, peppers and other heat-requiring vegetables. Last year one district shipped out $80,000 worth of such vegetables, practically all grown between trees. In many cases that made all the difference in the operation of the orchard. However, there is beyond this even the question of barn yard manure. In one case the owner of such a crop has had considerable profit and he is now trying vetch and mammoth clover. In other districts onions, potatoes, cabbages and other of the coarser vegetables are being grown to some extent successfully. With truck crops as with trees themselves, there is a time coming sooner or later when soil fertility becomes the paramount question.

I did not really intend to speak upon how to handle dairy cattle, hogs or chickens, which is beyond my scope. However, the Chairman has just hinted that my time is up and I thank you for the attention you have shown me. I thank you. (Applause.)

MR. WILLIAMSON: Why is there such a spread in the price that the consumer has to pay and the price the apple grower gets?

MR. WINSLOW: Why is there such a spread of price between the producer and the consumer? You can say there is not or you can ask what it is. There are two commissioners on my staff and we have been investigating that for three years. The spread is due to a number of things. One is the grip which the middle man has on nearly all classes of commerce. In looking into the margins in the fruit business we came to the conclusion that considering the character of the commodity there was not a greater spread in the case of British Columbia for these than in other commodities, such as drugs or groceries. Some progress has been made in reducing the spread, but from the producers' end action along that line has to be taken very carefully indeed, because the producer absolutely depends upon the middle man to move his product. When you have your car on the track there is no time to argue whether the middle man will get twenty-five or thirty cents. I cannot offer any solution to the question. A good deal of study to the dispute has shown me that the consumer can do more on his end of the dispute than the producer can. I have not answered your question because I cannot answer it.

CHAIRMAN: I will now call upon Mr. R. H. Campbell, Director of Forestry, to address the convention. (Applause.)

FORESTRY

MR. CAMPBELL: Mr Chairman, Ladies and Gentlemen,—I have not had an opportunity for a couple of years of attending the conventions of this association. I used to attend them and found them very enjoyable and made very good friends at those meetings, whom I am always glad to meet again. At the time I was attending those meetings I had something to do with water, but now I do not handle the water business at all and that is one reason I have not been here. Of

course, in Canada, we are apparently always getting nearer to the universal use of water, because it looks as if soon we will not be able to get anything else. (Laughter.)

My special work now is to look after forests and we consider the question of forests and their welfare a very important question. In Canada we look upon it from one point of view and in Europe they look at it from another point of view. It is rather interesting for us to get into their point of view to see what is the final way to look at the forests. A few years ago a commission appointed by the Imperial Government to look into the question of forests and forestry management presented its report and one paragraph in summing up its conclusions pointed out to the Imperial authorities that it was very important that steps should be taken to protect the forests and develop them as far as possible; that the countries of Europe were taking very active steps in that direction and felt that it was a good thing, and in spite of the protection given forests in the United States and Canada, the commission was still of the opinion that the crisis was bound to come. Then, again, one of the gentlemen in England who is very much interested in social conditions was making an investigation into the conditions in Belgium. Belgium before the war had 652 people to the square mile—more than one to the acre—which is the most thickly populated country in Europe. The farming there is very intensive. The farms are small and the land is not particularly rich generally. It has to be assisted very much by artificial manure, but in spite of that fact, this investigator reported that Belgium not only kept their forest area but was extending it, and upon enquiring as to whether it paid to do so, he was told: "We are not asking whether it pays or not; what we are thinking about is the betterment and improvement of our social conditions." That was the point of view in that thickly populated country from which they look at the forest, and that was the reason why they considered it necessary to develop their forest area.

The forest is very useful in many ways. I think it means very much to the social side of this country. The building of homes is dependent upon the product of the forest and we could not live in the comfort we do if we did not have the forest supplies at hand. It also assists every industry. The mining industry depends upon the forests, particularly the coal mining industry; also the development in connection with the distillation of pine oil from pine wood in Canada. Then upon the question of water supply the forest areas have a particular bearing. The sources of streams are, as a rule, in high forests. There has been discussion as to the effect of forests upon the water supply and there has been a difference of opinion about it. The general observation and impression has been that the forest increased considerably the regularity of the flow and actually increased the flow of streams. In order to demonstrate finally what it was, the forestry service of Switzerland started a series of observations upon two valleys contiguous to each other, containing streams. While one was in the midst of a forest, the vicinity of the other valley was deforested. The final reports are not yet public. The preliminary report is and it shows that the forest valley streams had a large regular flow and the flow was much larger than the flow of the streams in the deforested valley. The United States Government is making the same experiment in the vicinity of Colorado Springs so that a careful scientific investigation will confirm the general impression. That being the case, the Government here has set apart as forest reserves a great many of these lands from which streams flow, the object being to ensure as far as

possible the regularity of the flow and also to keep control of the reservoirs in the reserves which may be used at some time later for holding back the flood water to be used at a later period. We are doing considerable work in protecting the forest and trying to make it fulfil that amongst other functions and we believe it is of the greatest importance in connection with the water supply and the social condition of the people. I was very much impressed with that fact when visiting the Old Country a short time ago. The people I met in Scotland were lamenting very much the depopulation amongst the clans in the Highlands and they were counting upon the re-forestation of the hills as one of the main factors for assisting an increase in population in the Highlands. We are sometimes met with the argument that in establishing forests and keeping the lands in forests we are working against the development of the country and working against the increase in the population, but I believe that from the experience of the other countries an increase in the forest area improves social conditions. I believe myself that in working for the protection of the forest we are working for the betterment of the social condition of the people. Certainly no forester would keep back the population of his country. It makes his work easier to have an increased population. By intelligent forestry work I believe it will mean controlling the flow of streams to agricultural lands and that can be accomplished by forest protection, and the storing of water in reservoirs therein will regulate the flow of the water in the streams and the agriculturists will reap the benefit. So that the attitude of the forester is not one of decreasing or holding back settlement, but one to advance settlement and population. I thank you. (Applause.)

MR. CHAIRMAN: The next item on the programme is that of Professor W. H. Fairfield, Superintendent Dominion Experimental Farm, Lethbridge, Alberta. (Applause.)

Mr. Fairfield then addressed the convention as follows:

GROWING WINTER FEED UNDER IRRIGATION

The production of forage crops and the raising of live stock must necessarily go together for if we wish to keep live stock we must have forage crops to feed. On the other hand without live stock we have no way of profitably disposing of such crops after they are raised.

By the interest that has always been shown by delegates in past conventions of this association in discussions dealing with the keeping of live stock on irrigated farms, I am sure that we all fully appreciate the important, in fact, the imperative necessity of combining a certain amount of stock raising with our other operations on irrigated land. This is realized not only by the farmer on the irrigated lands on the prairies who is farming extensively, but right on down to the intensive farmer in the rich valleys of British Columbia, for even the peach grower with his five or ten-acre farm is beginning to appreciate the advantage of having a few milch cows.

A farmer on irrigated land has particularly favourable conditions under his control for the production of all kinds of forage crops. The amount of forage that is produced on a farm where irrigation is not practised is liable to be decreased

materially by lack of rain at the right time and on the other hand there is greater risk of having the crop damaged while being harvested.

I have been asked to speak upon this subject of "Growing Winter Feed under Irrigation." One cannot deal with such a subject as this in a very comprehensive manner without at the same time taking up the subject of live stock. However, time will not permit this and it will, perhaps, be quite fitting for me to stick closely to the subject assigned to me. If you will be good enough to bear in mind while listening to the few remarks I have to make, that the sole object of producing forage crops is for the maintenance of live stock, not only for the profit that will be derived from them but for the fact that we will be maintaining and increasing the productivity of our soil by so doing.

There are two broad classifications that forage crops naturally fall under—Annuals, those sown and taken off in the same season; and Perennials, those that keep growing from year to year after being sown. The latter class, that is, the permanent hay crops, are more important than the annuals.

Taking up annuals first, and naming them in the order of their probable value, we will have:

Corn;

Root Crops;

Green Feed—under which head will be: oats, wheat, etc., cut before ripening;

Millets.

The advantage of annuals is that a crop is obtained the current season, while with the perennials or ordinary hays no crop worth considering can be had the season the crop is sown.

Of the annual forage crops that can be grown satisfactorily at this latitude, corn will give the greatest quantity of roughage. In the irrigated districts of British Columbia this will, as time goes on, be a much more important crop in my judgment than it is at the present time. On account of the longer season, it will produce better than on the prairies. Especially in districts where fruit is grown to a greater or less extent it will be found to be a satisfactory crop to grow between the trees, at least while they are young.

Corn fed as silage is best, but it can be stooked and left in the field in a cured condition and fed as required. It is very palatable to all stock and is rich in energy and heat-producing constituents, and when combined with some concentrate, excellent results are obtained. When fed with some fodder rich in flesh-producing constituents such as alfalfa or clover, very little concentrates, if any are required. The stage of maturity it is desirable to have the corn reach by cutting time is for the ears to be well developed and the kernels just about reaching the glazing point. This should not be difficult in most irrigation districts in British Columbia if early varieties are used, although in Alberta and Saskatchewan the season is too short to allow ordinary fodder varieties to reach this point. The yield of fodder weighed green as cut varies from 10 to 30 tons per acre. Under average conditions in irrigated areas in British Columbia there should be no difficulty in getting the crop to go 18 to 20 tons per acre. To get the best results a silo should be used. However, as previously mentioned, it is not absolutely necessary to have one. If silage is made, the corn should be cut as it is put in. If fed dry, it should be cut as fed, for if a quantity is cut up and placed in a large pile it is inclined to ferment.

Roots come next in importance to corn as an annual forage crop. The actual tonnage per acre of turnips and mangels is not much different from corn, but it requires more labour, at least at certain times in the season, than is the case with corn. This is a disadvantage for in a new country labour is scarce and we are compelled to consider the cost of producing any particular crop on our farm from a distinctly different angle than we are accustomed to in a country where labour is relatively cheap and easy to obtain. The viewpoint that we are forced to take is: How many tons per man can be obtained from a certain crop as well as how many tons per acre—and in many cases we know that is the much more important consideration. Another important point that has to be considered when determining the cost of producing a certain kind of crop on our farms is not only the amount of labour that will be required, but just the particular time during the summer when it will be required so as to know whether it will conflict with other farm work. The reason why it is difficult to arrive at the cost of production of any particular crop on the farm expressed in exact figures, is because it is so hard to correlate these various factors in a practical manner.

In comparing roots to corn fodder we have to take into consideration the kind of stock to be fed and whether the farmer has a silo. It is generally conceded that under ordinary circumstances a ton of corn silage can be produced much cheaper than a ton of roots. If, however, a farmer has not a silo on his place he should raise some roots to take the place of silage for his milch cows and so provide succulency in their winter rations.

GREEN FEED

In irrigated areas on the prairies and no doubt in most parts of British Columbia where irrigation is practised, the cheapest annual forage crop to raise is "green feed," that is, one of the ordinary grains cut before it ripens and made hay of. Under ordinary circumstances oats give the greatest tonnage per acre and the quality is excellent both as to palatability and food value. If horse hay is required, wheat is a little more desirable although the yield will usually be somewhat lighter.

Millets are not as a rule very satisfactory on the prairies as the seasons are not always warm enough to produce heavy yields. In most of the valleys of British Columbia they should do better, but the main objection is the cost of the seed, which is, as a rule, much higher than grain.

PERENNIAL FORAGE CROPS

Coming now to the perennial forage crops, we are taking up the most generally grown and in the aggregate one of the most, if not the most, valuable products of the irrigated lands.

In Saskatchewan, Alberta and to a limited extent in British Columbia, our native grasses along the river and creek bottoms are irrigated by the wild flooding method and large quantities of hay are produced. This is probably the simplest form of irrigation that can be practised. It is not an economical way of utilizing the water, but, on the other hand, it requires the minimum amount of labour and appears to be quite satisfactory where water is plentiful and the character of the

soil is such that the alkali problem is not developed. Our delegates from the Cypress Hills Water Users' Association fully appreciate the value of this method of utilizing the spring flood waters which would otherwise go to waste.

In the growing of timothy under irrigation on the prairies, one interesting point has been brought out by hay growers in the Lethbridge district during the past decade. That is, that a more satisfactory timothy meadow can be obtained by sowing the seed on the native prairie sod without ploughing than when sown on cultivated land. The common practice is to sow the seed and double disc the land when it is somewhat moist. This does not cut into the natural sod enough to injure it. In fact it stimulates the growth of the native grasses and covers the timothy seed sufficiently to prevent it being washed away when the land is being irrigated. The hay produced from a meadow of this kind is a mixture in which timothy usually predominates. The native grasses which it contains greatly improve the general quality of the hay.

ALFALFA

With reference to the cultivated hay crops for irrigated lands, it is needless to point out that alfalfa has a place of its own. No other crop can approach it in its ability to produce a large tonnage of very rich hay. Alfalfa and irrigation are always associated in our minds, although it is being grown more and more under humid conditions, it is only under irrigation that it reaches its highest perfection. It is peculiarly adapted to irrigation in that drought never kills it, and that when moisture is applied any time during the growing season it responds rapidly with a luxuriant growth. It only asks plenty of sunshine and warmth with a sufficient supply of moisture, and it grows continuously from early spring to fall frosts. It is different from the grasses in that while they require plenty of moisture during the early part of the season (in late April, May and June) and will fail to make satisfactory growth if there is an extended period of drought during this time, alfalfa is not affected further than it fails to make as much growth at this particular time as it otherwise would, but during July and August when other grasses are failing it makes its most rapid growth.

One thing that gives alfalfa a value entirely distinct from any of the grasses is that it is such a wonderful soil renovator. Owing to its deep rooting system, it far exceeds any of the clovers in this regard.

For a crop to plant between fruit trees it has certain disadvantages. On account of the large roots it is more difficult to plough than clover, which is more commonly used in such places. With a proper plough, however, it is not so difficult to turn down as is commonly believed.

In conclusion, I merely wish to point out that before the farms on our irrigated lands can reach their highest stage of productivity, no matter whether they are in Saskatchewan, Alberta or British Columbia, there must be carried on them a goodly supply of live stock. I know that in making this statement I am only reiterating what is being said on every platform from which a speaker on agricultural topics is heard, and it is being preached continuously by the agricultural press—not with special reference to irrigated farms, but with reference to all farms, still the success of the farmers on irrigated lands depends more on their going into

diversified farming even than the farmers that are operating without the aid of irrigation. On account of the added expense of irrigation he, the irrigation farmer, is compelled to farm on somewhat smaller areas and therefore he must farm just that much more intensively. To do so and to get the best results possible, he must maintain a proper balance in his operations. He must utilize all he produces to the very best advantage. (Applause.)

MR. CHAIRMAN: I am sure you have listened with great interest to Mr. Fairfield's address. There is only one thing that struck me, and I do not know if it did the audience. Mr. Winslow and Mr. Fairfield do not seem to agree as to which is better to grow, clover or alfalfa, in our orchards.

MR. FAIRFIELD: I do not profess to be a fruit grower and the question of growing alfalfa between fruit trees would be a question that should be decided by the fruit grower himself. I thought I listened very closely to Mr. Winslow's remarks and was under the impression that I did not make any statement to conflict with anything he said.

MR. WINSLOW: The growing of alfalfa is in the experimental stage and in some orchards in this province it has given excellent results, while in other orchards disastrous results have followed it. I suppose the real result is somewhere half-way. I hope that before long we will know more about it. I think that in fruit growing the competition is keener and the man who can grow alfalfa successfully in his orchard will be successful, but it will be a few years yet before we are going to be able to lay down rules as to when it can be grown, and where, and whether it can be grown successfully.

MR. WOLLASTON: The last speaker said something about corn. I agree that it can be grown in British Columbia. Now, some of us have planted corn and mangels and roots, and while I think the roots and mangels did not have any detrimental effect on the trees, I think the corn did have some. The corn matured profitably, but I do not think it had a good effect upon the orchard.

MR. THORNBER: I did not want to get into this question, but for some years we have grown corn and roots and alfalfa and I will just tell you what we found out in regard to them. We found corn the best inner crop we could grow between our trees because it compels us to give extensive cultivation to get good results from our trees. I have grown it myself for some years. Be sure to give it plenty of water at the last of the growing season in order that your trees will not get dry.

In reference to alfalfa in the orchard. We have come to the conclusion that if we use it thinly there it is a decided benefit. We have worked side by side with a great many plots. I think we had forty of them altogether. Alfalfa was sowed thickly in some plots so that it grew fine hay. We could not work up the soil and it was injurious to the trees in the orchard. However, where it was sowed thinly, in the spring we would go in and work up the soil six inches in depth, and it was always beneficial. We are now working it this way. Our alfalfa is put in, worked up evenly, harrowed down, our irrigation ditches put in and then, after cutting,

we immediately disc again. First and second cuttings are always taken out. If we want a third cutting we again disc up, and harrow down our ditches again. We do not reduce our cost of operation as much as we would like to, but we get more hay and it does not hurt our trees and we have been doing this for eight years. I think there is a big opportunity in orchard growing for this work.

We must have returns from our labour in the orchard and our interest and taxes first from the sod crops before we expect to take anything from the fruit at all. That is the only plan we work upon in our orchard work at the present time. If you seed too thickly and then quit or neglect that part of your work and expect to come along later on and cut the hay and take it away, you had better cut your trees down because you will find them in the way all the time.

MR. STRACHAN: I would like to say that my experience with trees has been something as follows: We planted apple trees last spring and I thought a good way to cultivate between the trees would be to plant corn. The corn was planted forty inches apart and the tree took the place of a hill of corn, so that when cultivating the hills of corn we cultivated the trees. About the middle of July the corn was up six feet or more and the trees were at a standstill and are still at a standstill. They are growing, it is true, but they have never recovered from the effects of it. That was my experience last year.

MR. THORNBER: For my own information, would you mind telling me how tall that corn grew?

MR. STRACHAN: The tall corn grew six feet.

MR. THORNBER: We do not advocate a very high corn, not any higher than six feet. We have had 2,400 acres in at a time. I can conceive, however, that where you put in a tall growing corn it will smother the trees or take the plant food from the trees. Last year I conceived the idea that a sunflower crop would be all right. So I tried it out before recommending it to any other man. We tried it in an acre plot. The seed in the row was about eighteen inches apart, just one plant in a place. Those sunflowers produced a growth of about eighteen feet and I was very much concerned as to whether I had killed the trees in the orchard. You can imagine what it looked like with trees six years old. By giving lots of water we got a good crop of apples and now, this year, there is a splendid promise of fruit on the apple trees. We, however, insist upon plenty of water at the close of the growing season, no matter what crop it is. Where we let them go in dry we injure them almost every time.

MR. CARRUTHERS: Have you never found difficulty after having your hay cut by it being necessary to irrigate your fruit trees and not being able to do so on account of your hay?

MR. THORNBER: Where there is danger of that we cut our ditches before we cut the hay. We get the water in very quickly after taking the hay out.

MR. WINSLOW: I may say there is no difference in Professor Thornber's experience than those that I have heard from the floor. In Lewiston they have a much longer growing season than in British Columbia. I may say that we have found it possible to grow alfalfa between our young trees with good success. A man who found that we were doing it attempted it himself in a district where the soils were entirely different and the results were not at all satisfactory. In British Columbia we are watching the thing very closely, but it will be some little time yet before we can say definitely just what is what in reference to this.

MR. RANKIN: (Reads latest war news off the wires which is received with interest.)

CHAIRMAN: I will now call upon Mr. J. R. Fryer, of the Seed Branch, Department of the Interior, Calgary, who will address the meeting on

THE PRODUCTION OF HOME-GROWN FIELD AND GARDEN SEEDS TO SUPERSEDE FOREIGN IMPORTATIONS

MR. FRYER: Mr. Chairman, Ladies and Gentlemen,—We have been listening to suggestions as to what to grow in orchards and amongst other things have been mentioned the growing of alfalfa. I was very glad to hear Dean Klinck refer to the necessity of testing corn in the ear. As you know, to your sorrow no doubt, corn bought in the shell is very poor in germinating qualities. Mr. Bark, in an address, also suggested the growing of clover and garden seeds on a business basis.

My subject, as announced, is: "The Production of Home-grown Field and Garden Seeds to Supersede Foreign Importation."

Before the outbreak of the present European War, Canada was almost entirely dependent on foreign countries for her supply of field root and vegetable seeds. Germany and France contributed very largely in meeting our demands for such seeds. The following statistics of importations of a few kinds of seeds during the year 1913-1914 will convey some idea of the quantities of these seeds obtained from foreign countries annually.

IMPORTATION OF SEEDS INTO CANADA, 1913-1914

Beets and mangels	1,285,198	lbs.,	three-quarters of which came from France and Germany.
Carrot	32,687	"	from France.
Turnip	126,687	"	from France.
	224,162	"	from Holland.

RECEIVED AT TORONTO PORT, YEAR 1913-1914

Radish	4,621	lbs.	
Cabbage	1,865	"	
Garden Beet	6,825	"	
Celery	1,202	"	
Parsnip	1,900	"	from Germany alone.

With the exception of a few kinds of seeds which are easily grown in the farm garden, and a limited quantity of turnip seed grown on a commercial scale in Nova Scotia, as well as small quantities of sugar beet seed grown in the province of Ontario, Canada produced practically no vegetable seeds previous to 1915. When the war broke out it was realized by the Canadian Seed Trade and the Dominion Department of Agriculture that importations of seeds from European countries would be, if not cut off entirely, very seriously curtailed, and hence some concern was felt as regards the prospect of obtaining sufficient quantity of these seeds to meet the requirements of Canadian farmers. In view of this outlook, the Dominion Department of Agriculture decided to warn Canadian growers and to try to induce them to grow sufficient quantities of such seeds as mangel, sugar beet, turnip, carrot, parsnip, onion, etc., as they would need for their own use and also for the use of farmers whose climatic conditions might not be favourable to the production of seed. It was realized that on account of the difference in the cost of labour between European countries and Canada that some additional help would have to be given growers in order to induce them to grow seed. Hence, the Minister of Agriculture at Ottawa authorized the payment of subventions or bonuses to bona fide growers of the following kinds of seed.

SCHEDULE

Schedule of the kinds and varieties of seed, the amount of subvention that may be paid per pound of re-cleaned seeds to bona fide growers of them, and the minimum and maximum number of pounds of selected seeds of each, for which any person or company of persons may receive subvention.

Kinds of Seed	Subvention per pound	Number of pounds for which subvention may be paid	
		Minimum	Maximum
Mangel or Sugar Beet	.03	100	10,000
Turnips or Swedes	.04	50	5,000
Carrots, field or garden	.07	30	3,000
Beets, garden varieties	.10	20	2,000
Parsnip	.07	10	500
Radish	.09	10	1,000
Cabbage	.25	10	400
Tomato	.50	10	100
Onion	.25	10	2,000
Celery	.40	10	100
Lettuce	.20	10	500
Cucumber	.20	10	100
Water-melon	.20	10	100
Musk-melon	.30	10	100

The amount of these subventions varies according to the difficulty of growing the different kinds of seeds.

The Provincial Departments of Agriculture were also to render assistance chiefly in an educational way. The Seed Branch of the Dominion Department of Agriculture was commissioned in the fall of 1914 to initiate the work of vegetable

seed growing in the different provinces. The Seed Branch officers visited many of the farmers in the different districts of the country, placing the situation before them and requesting them to grow seed. The press also assisted by putting the situation before the public. The officers of the Dominion Experimental Farms Branch were to supply to interested farmers the technical information as regards growing the different kinds of seeds.

The work of the first year was to be more or less experimental to determine, if possible, districts suitable for growing the different kinds of seeds, which had hitherto been imported.

In British Columbia about twenty growers, chiefly in the Okanagan and Fraser River valleys grew seed last year. The results in these districts were very gratifying indeed, the yields in practically all cases being very much larger than the average yield in the province of Ontario. In some cases as much as three times the average yield was obtained, and in all cases where the crops had been handled properly the quality of the seed was very much superior to the usual run of imported seed of the same kinds.

As regards the cost of the production, not much data are at our disposal as farmers do not usually keep records of cost. Mr. Moore, Superintendent of the Dominion Experimental Farm, Agassiz, however, kept records of cost of production of mangel seed and after valuing the seed production at 18 cents per pound, declared a net profit of $170.90 per acre. These figures are based on a small area, where most of the work was done by hand. If a larger area had been used the cost of production would have been proportionately smaller.

The Seed Branch also assisted in marketing the seed grown by putting the farmers in touch with the seed merchants of Canada. Lists of the chief seed merchants were mailed to each of the growers and likewise lists of the growers with seed for sale were sent to the larger seed merchants of the Dominion.

The success of last year's work in growing field root and vegetable seeds in Canada was so marked that the Department of Agriculture is now endeavouring to establish seed growing on a permanent basis. It is the aim of the Department now to release Canada from the dependence on foreign seed supplies by:

1. Encouraging farmers and gardeners in general to grow sufficient good seed of all kinds and varieties required in their localities.

2. Acting as intermediary between reliable merchants and those growers in any of the provinces who have shown themselves reliable.

3. Organizing centres for the production for Canadian wholesale and retail requirements of those kinds and varieties most valuable, considering the needs of different climates, soils and markets.

4. Assisting in procuring apparatus needed in seed centres for harvesting, threshing and cleaning seed ready for market.

5. Gradually introducing guarantee system in respect to place of growth, variety and strain of seed, and percentage vitality.

A system of inspection of crops will be followed, under which a Seed Branch officer will inspect the crops while growing to see that they are true to variety. He will also inspect the seed after it is threshed and cleaned and take samples of all lots for test at the Seed Laboratory, Calgary. Certificates of the reliability of the seed will be issued to growers by the Seed Branch. These will act as a guarantee

to the growers as to the germination quality of the seed. Growers will be encouraged and assisted in making contracts with seed merchants.

This year the Seed Commissioner has commissioned an expert horticulturist in the province of Ontario, and one in the province of Quebec, to look after the organization and development of the seed growing industry in these two provinces. Next year it is his intention to appoint such an expert horticulturist for the province of British Columbia. It will be his duty to assist growers in every possible way, advising them in selecting roots, growing and harvesting the seed grown. He will study market conditions throughout the whole of Canada and aid growers in marketing their seed. He will advise them as to the varieties and quantities that may be safely grown each year. He will organize seed growing centres and assist in procuring apparatus that may be needed for harvesting and threshing and also cleaning the seed for market.

By such a plan it is hoped that the whole field root and vegetable seed growing industry in British Columbia may be kept in a thoroughly organized condition so that Canadian farmers may be supplied with seeds of the very best quality and that growers may be so aided and advised that they will not only sustain no financial loss but that they may each year obtain very substantial profits from seed growing.

It is very probable that in the district of Kamloops such a seed growing centre will be established for growing those seeds which prove to grow satisfactorily under these climatic conditions. Especially will it be desirable to grow seeds on irrigated land, the advantage of such conditions being the perfect control of water supply and a dry atmosphere while crops are maturing and are being harvested. (Applause.)

CHAIRMAN: I think this question of growing seed is an important one and if there is any question any one would like to ask, please do so now.

DELEGATE: In our section of the country we raise timothy, clover, alfalfa, and wheat, oats and barley. I would like to get an opinion as to the quantity of seeds to be sown to the acre. Some tell us we should put on twenty to twenty-five pounds of timothy and clover, and others eight pounds to twelve mixed. Others say that alfalfa should be from fifteen to twenty-five pounds; wheat from sixty to ninety pounds; oats two bushels per acre; barley two bushels per acre. This is an important point and I would like to hear something about it.

MR. FAIRFIELD: I heard the first part, I think, of the question, but I do not think I got the whole of it. I think I could answer that question definitely for Alberta conditions. As Mr. Winslow pointed out, different conditions affect fruit in different localities. The same applies to wheat crops, and I can tell you about the amount of seed we find best to sow in Alberta, but I am not prepared to say it is best to sow here. We find that for grains on irrigated lands it paid us to sow much more than we would on dry lands. The average results for five years for wheat, oats and barley is something like this: Wheat, about a bushel and a half or, putting it in pounds, from 90 to 105 pounds for wheat; oats, about 100 pounds. Seeding with grasses on irrigated lands, we find 15 to 20 pounds of alfalfa; and for

timothy we seed it lighter—just why, we do not know—from 4 to 7 pounds of timothy gives us better results and better seed. There is something in the character of our soil that is the reason for that. For mixtures of alfalfa and timothy we are doing practically nothing or with clover on the prairie yet. We sow just as much alfalfa as if we did not sow timothy and then add about four pounds of timothy to the alfalfa.

CHAIRMAN: I will now call upon Mr. Fairfield to make his report as Chairman of the Credential Committee.

MR. FAIRFIELD: Your Committee on Credentials have to report that we find 149 registered in attendance at this convention. Of this, 85 are accredited delegates. (Applause.)

The names of the accredited and registered delegates are as follows:

F. W. Anderson, Heffley Creek Water Users' Association, Heffley Creek, B.C.
C. H. Attwood, Calgary, Dominion Water Powers Branch.
James Aird, Kamloops, B.C.
F. S. Auld, Department of Agriculture, Regina, Sask.
J. C. Adams, Chase, B.C.
J. L. Brown, Kamloops, B.C.
W. J. E. Biker, Board of Trade, Nelson, B.C.
Mrs. W. J. E. Biker, Nelson, B.C.
Don Bark (A.R. & I. Company), Strathmore, Alberta.
Mrs. Don Bark, Strathmore, Alberta.
Senator Hewitt Bostock, Monte Creek, B.C.
Isaac Blair, West Summerland, B.C.
G. D. Brown, Kamloops, B.C.
Thomas Bunting, Heffley Creek, B.C.
Albert E. Boyde, Pritchard, B.C.
W. G. Benson, Kelowna, B.C.
I. R. Brown, Summerland, B.C.
H. J. Bowling, Pritchard, B.C.
C. G. Cline, B.C. Hydro-Survey, Kamloops, B.C.
D. Roy Cameron, Dominion Forestry Branch, Kamloops, B.C.
F. W. Crandall, Calgary, Alberta.
James Clapperton, North Kamloops, B.C.
V. D. Currie, Kamloops, B.C.
E. M. Carruthers, Kelowna, B.C.
J. Connor, North Thompson Agricultural Association.
W. Charlton, Pritchard, B.C.
R. Chetwynd, Walhachin, B.C.
R. H. Campbell, Director of Forestry, Ottawa, Ont.
F. W. Carpenter, Bassano, Alberta.
A. D. Campbell, C.P.R., D.N.R., Calgary, Alberta
A. O. Cochrane, Vernon, B.C.
James Dougall, Agricultural Agent, C.P.R., Winnipeg, Manitoba.
John Dixon, Maple Creek, Saskatchewan.

A. S. Dawson, C.P.R., D.N.R., Calgary, Alberta.
C. L. Dodge, Strathmore, Alberta.
Mrs. C. L. Dodge, Strathmore, Alberta.
H. O. English, Department of Agriculture, Victoria, B.C.
A. E. East, Walhachin, B.C.
John Enges, Pritchard, B.C.
J. East, Walhachin, B.C.
A. L. Fryberger, Bassano, Alberta.
W. H. Fairfield, Lethbridge, Alberta.
Fred J. Fulton, Kamloops, B.C.
J. R. Fryer, Seed Branch, Calgary, Alberta.
Geo. Frolek, Rose Hill, B.C.
P. E. French, Vernon, B.C.
J. W. Gibson, Educational Department, Victoria, B.C.
Dr. H. H. George, Kamloops, B.C.
James A. Gill, Kamloops, B.C.
C. W. Greer, Black Loam P.O., B.C.
W. Grundy, Walhachin, B.C.
H. P. Hodges, Kamloops, B.C.
W. T. Hicks, A.R. & I. Co., Lethbridge, Alberta.
Mrs. W. T. Hicks, Lethbridge, Alberta.
E. A. Howes, University of Alberta, Edmonton, Alberta.
R. H. Helmer, Experimental Station, Summerland, B.C.
R. B. Homersham, Heffley Creek, B.C.
G. E. Hyde, C.P.R., D.N.R., Calgary, Alberta.
G. S. Herringer, Maple Creek, Saskatchewan.
W. R. Hustin, Heffley Creek, B.C.
Wm. Harrison, Pritchard, B.C.
E. W. Hogan, Department of Agriculture, Victoria, B.C. .
Edward Hole, Walhachin, B.C.
— Hemming, Walhachin, B.C.
D. R. Ilsley, Armstrong, B.C.
F. M. Iratt, Walhachin, B.C.
D. B. Johnstone, Kamloops, B.C.
James Johnstone, Nelson, B.C.
F. J. Jounsey, Pritchard, B.C.
G. K. Jones, Kamloops, B.C.
Mrs. G. K. Jones, Kamloops, B.C.
E. B. Knight, White Valley Irrigation and Power Co., Vernon, B.C.
L. S. Klinck, University of British Columbia, Vancouver.
J. R. Kinghorn, Sorrento, B.C.
C. E. Lawrence, Local Secretary, W.C.I.A., Kamloops, B.C.
C. E. Lawrence, Jr., Kamloops, B.C.
J. L. Logie, Summerland, B.C.
Rev. C. R. Littler, Kamloops, B.C.
James Livingstone, Tranquille, B.C.
Robert H. Lyons, Heffley Creek, B.C.

Father Lejeune, Kamloops, B.C.
G. A. Morrison, Box 1379, Calgary, Alberta.
Mrs. G. A. Morrison, Box 1379, Calgary, Alberta.
J. H. McCulloch, Quesnel, B.C.
F. D. McNaughton, Brooks, Alberta.
A. L. McNaughton, Kamloops, B.C.
W. S. Mitchell, Notch Hill, B.C.
P. H. Moore, Experimental Station, Agassiz, B.C.
H. F. Mytton, Fruitlands, Kamloops, B.C.
R. P. Mytton, B.C. Fruitlands Co., Kamloops, B.C.
J. McCaig, Agricultural Publications, Edmonton, Alberta.
Alderman George Macbeth, Kamloops, B.C.
W. T. MacDonald, Department of Agriculture, Victoria, B.C.
J. McKechnie, Kamloops, B.C.
A. McKay, Kamloops, B.C.
J. McConnell, Kamloops, B.C.
A. McGraw, Vernon, B.C.
J. F. McDermind, Pritchard, B.C.
N. Hugh Nixon, North Kamloops, B.C.
V. A. Newhall, Hydrometric Surveys, Department of the Interior, Calgary, Alta.
Andrew Noble, Sr., Kamloops, B.C.
T. Noble, Louise Creek, B.C.
R. Noble, Long Lake, B.C.
A. G. Noble, Knoxford, B.C.
Wm. Normand, Pritchard, B.C.
F. H. Peters, Commissioner of Irrigation, Calgary, Alberta.
G. E. Parham, Experimental Station, Invermere, B.C.
S. G. Porter, Irrigation Branch, Department of Interior, Calgary, Alberta.
G. H. Patrick, Strathmore, Alberta.
A. Peterson, Mound Olie, B.C.
W. P. Pritchard, Pritchard, B.C.
C. W. Peterson, *Farm and Ranch Review*, Calgary, Alberta.
Norman S. Rankin, Secretary W.C.I.A., Calgary, Alberta.
Dr. J. G. Rutherford, C.P.R., Calgary, Alberta.
John Redman, Knutsford, B.C.
James Ross, Tranquille, B.C.
R. S. Stockton, Strathmore, Alberta.
Mrs. R. S. Stockton, Strathmore, Alberta.
Robert J. C. Stead, Calgary, Alberta.
E. R. Simpson, Summerland, B.C.
F. J. Smith, Heffley Lake, B.C.
E. R. Simpson, West Summerland, B.C.
R. G. Swan, Can. Soc. C.E., Vancouver, B.C.
J. F. Sweeting, Calgary, Alberta.
J. P. Shannon, Kamloops, B.C.
F. E. Simpson, Kamloops, B.C.
L. F. Stobart, Kamloops, B.C.

C. G. Smith, Salmon Arm, B.C.
D. W. Strachan, Tranquille, B.C.
J. F. Smith, Indian Agent, Kamloops, B.C.
R. A. Travis, Bassano, Alberta.
Mrs. R. A. Travis, Bassano, Alberta.
Mayor A. M. Tyrrell, Kamloops, B.C.
H. Thornber, Department of Agriculture, Victoria, B.C.
Ald. Jos. E. Tedder, Kamloops, B.C.
Dr. Tolmie, Department of Agriculture, Victoria, B.C.
Professor W. S. Thornber, Pullman, Washington, U.S.A.
E. C. Thrupp, Kamloops, B.C.
E. Stuart Wood, Kamloops, B.C.
F. E. R. Wollaston, Coldstream Estate Co., Vernon, B.C.
Dr. F. F. Wesbrook, University of British Columbia, Vancouver, B.C.
Frank Woodward, North Kamloops, B.C.
W. A. Wylie, Kamloops, B.C.
R. M. Winslow, Department of Agriculture, Victoria, B.C.
James White, Commission of Conservation, Ottawa, Ont.
J. H. Woodward, North Kamloops, B.C.
R. G. Williamson, Maple Creek, Saskatchewan.
W. J. Whiteside, Toronto, Ont.
Mrs. W. J. Whiteside, Toronto, Ont.

CHAIRMAN: I will now ask Mr. Peters to make his report on Resolutions.

MR. PETERS: These resolutions are now open for discussion as they are read out and then they will be in order to be voted on.

Number One. Proposed by President G. R. Marnoch, of the Lethbridge Board of Trade; seconded by Secretary D. J. Hay, that:

Whereas the Western Canada Irrigation Association is informed by the Lethbridge Board of Trade that the preliminary surveys contemplating the extension of irrigation facilities to areas south and east of Lethbridge have temporarily been suspended and

Whereas the desirability of extending irrigation to lands suitable for its use is becoming increasingly more evident as the live stock industry in Western Canada progresses,

Resolved that this association would respectfully urge the Minister of the Interior, the Honourable Dr. W. J. Roche, to continue these surveys.

MR. FAIRFIELD: I would like to have the privilege of saying a word in connection with this resolution. Unfortunately the President of our Board of Trade of the city of Lethbridge, Mr. G. R. Marnoch, cannot be present. There is nothing contentious, of course, about this resolution. I merely want to point out that it is a very important thing to the district affected which lies adjacent to Lethbridge. A great deal, if not all, of this land has already settlers on it and they need the water very much. This particular place illustrates the point that Mr. Peters brought out in that very interesting address of his in regard to district irrigation projects.

We already have the people or a great number of the people on the land, but the surveys have been stopped. We feel in that district that it would be not only of value to those interested, but it will add a great deal to the wealth of the province if that land can be developed properly and the only way we can see that it can be worked properly is by the early application of water.

CHAIRMAN: I will put the resolution to the meeting. All in favour of the resolution, say "Aye"; to the contrary, — (None).

I declare the resolution is carried.

MR. PETERS: Resolution Number Two.

Moved by A. E. Boyd, Pritchard, B.C.; seconded by Wm. Harrison, Pritchard, B.C.:

That the Government be urged to consider the putting of water on to the river flats and lower benches on the South Thompson river using the existing creeks for the lands higher up.

MR. BOYD: I have much pleasure in moving that resolution and would ask the association to ask the Government to give us assistance in putting water on the South Thompson valley.

MR. HARRISON: I take pleasure in seconding this resolution. The idea is to survey the water in certain creeks and bring them through Harper valley which will leave the water a thousand feet above the level of the South Thompson. It would bring a lot of land between Shuswap and Ducks at present without water under irrigation. It could be taken through by pipe to the north side and as you will all have noticed in passing the South Thompson, an oasis in the desert, it would make it to blossom like the Garden of Eden. What we want them to do now is to assist us in getting the water.

MR. THRUPP: I want to assure the people of Pritchard that I am not criticising them, but I think it should be a matter for action under section 13 of the Water Act of 1914. It would be quite a simple matter for the Pritchard people to act under this section and to proceed under the Irrigation Corporation Act. I think it would be rather a pity if this association should pass a resolution asking the Government to pass a scheme under a new principle. The Irrigation Corporation Act has been thoroughly discussed and approved by this association. It would be much better if the Pritchard people would be content with a resolution asking for such treatment. I know other districts which would be served in the same manner as the Pritchard people desire, and I was going to ask the Pritchard people to accept an amendment under which everybody would be interested and which would apply to all other districts in the same position. I would suggest something like this: That the Government be asked to give its consideration to any schemes of irrigation which would improve the beneficial use of water.

MR. MYTTON: I would second such an amendment.

MR. HARRISON: That would suit our views entirely and we would agree to such an amendment.

MR. LAWRENCE: It is something strange to hear Mr. Thrupp move for action by the Government. What the Pritchard people want to do is something that the Government can take hold of. I believe there is enough on paper already and we who are on the land know it to our cost. These projects are beyond independent and individual action. It must be done this side of the Rockies, the same way that it is done on the other side. If we could bring Mr. Peters over here and have him deal with the problems the same way as he does over in Alberta, we would be very much better off. Instead of having to dam up creeks and bring water through lakes for miles it would be helping us out. Instead of having sage brush along the river as we have now, we should be having an irrigation proposition with mixed farming and live stock. It is our experience and the experience of others that we are kept poor after spending all the money we brought to the country labouring to bring the water on to the land. (Applause.)

MR. BOYD: That is exactly the position of the Pritchard people. I have been struggling on 60 acres of dry land to make a living. I came here with $1,500 and it is all spent now. If the Government would come out and assist us in getting water and make some surveys for us, we could live on our land. Instead of living there, I have to go out and help a man who is making hay on his place. If I could not do that I would have to get out. I claim that the country along the South Thompson river is one of the finest countries in British Columbia. We have to get water and it costs us money. We have not the money and we know the Government has. We have tried and know that any piece of land that has water on it by irrigation methods or by being able to hold back the snow water for it, will grow a crop and every acre of my land would grow a crop and make me independent if I were in a position to apply water to it. As it is I have to leave my land while I rustle for a living.

MR. MYTTON: My sole reason in seconding this motion was that I thought it unfortunate for this association to pass a resolution asking the Government to aid any one district. We are a Western Canada association and I think the Government should take over the whole of the irrigation systems of the country and not aid any part in particular. I am totally in favour of helping the Pritchard people or any other community of people, but I do not think we should take any particular locality of our province and ask the Government to aid that one part.

MR. WOODWARD: I think, in asking the resolution, the Government could hardly refuse. There are always two sides to the question. On the Lower Fraser river the Government has expended money to keep the water off the lands. We in the upper country are asking them to spend money to put the water on the land.

MR. PETERS: I would like to explain that when this resolution came before the Committee, I think it was the understanding of the Committee that in passing this resolution we felt that all that the people of Pritchard were asking was that the Government of British Columbia send somebody out to investigate the conditions with a view to giving these interested men some idea as to whether the thing could be worked out, or not, and how it could be worked out. I make the state-

ment because it seems to get away from the point that Mr. Mytton objects to, namely, asking the Government to do something for one particular section. That is the way we looked upon this resolution.

CHAIRMAN: You have heard the resolution as moved by Mr. Boyd and seconded by Mr. Harrison, and you have heard the amendment moved by Mr. Thrupp and seconded by Mr. Mytton. Did I understand that Mr. Boyd and Mr. Harrison were willing to withdraw their resoltuion?

MR. HARRISON: We did not really mean it to affect only the South Thompson River district.

CHAIRMAN: Of course, you have to vote on the amendment first of all.

MR. HARRISON: Then we will allow our motion to stand.

CHAIRMAN: I will read the amendment over: "Moved by Mr. Thrupp, seconded by Mr. Mytton, that the Provincial Government be asked to give favourable consideration to any schemes of irrigation corporations, where transfers of water licenses to new lands would improve the beneficial use of the water in the district."

Those in favour of the amendment, please say "Aye"; to the contrary,—

MR. BROWN: I would like to see a standing vote taken and that only members be allowed to vote on it. The original motion is a concrete motion and the amendment is one that may be put up to the Government and left in their hands for any indefinite time.

CHAIRMAN: I have been asked to read both the amendment and the resolution again and then I will ask you to stand up and vote. (Chairman reads resolution and amendment.)

Vote on the amendment results in 17 in favour of it; 14 against it, therefore the amendment is carried.

MR. PETERS: The next resolution is:

Moved by Mr. E. W. Carruthers (Kelowna); seconded by Mr. W. P. Pritchard (Pritchard),

Whereas there is a serious danger in many parts of the dry belt of British Columbia that the farmer may be unable to receive the necessary supply of irrigation through the inability of various irrigation companies to carry out their original contracts as conveyors of water,

Therefore be it resolved that this convention in open meeting assembled, do urge the Provincial Government of British Columbia to take immediate steps to deal with this serious problem, and thus restore confidence and ensure an adequate water supply to the settler.

MR. CARRUTHERS: This motion more or less overlaps the amendment to the last motion, but at the same time I think it is of such importance that I make no excuse for speaking to it. Before going further I would like to express my regret

and I think I am voicing the opinion of many here that the British Columbia Government has not thought this convention worthy of sending representatives here to discuss this problem of irrigation. This problem is, I think, that many water companies and water municipalities have gone in in good faith and put in large irrigation works and now find they have bitten off more than they can chew, with the result that many of them are now drifting off into deep water. This feeling of uneasiness and insecurity should be eliminated as near as possible so that people who are living here in one of the most productive parts of the province should be able to speak with authority that the water is here and that we can get it. I do not for one moment intend to suggest remedies; I think that point is much too contentious, but if, as many of our officials claim, the water carrying companies come under the head of water companies, it should be put up to them to settle this feeling of uneasiness and thus satisfy the settler who is always trying to bring some other settler here to increase prosperity. This is a matter which applies generally all over British Columbia. It is essentially a British Columbia motion, but at the same time I can assure the delegates from the sister provinces that it is a matter of very serious import to us.

MR. PRITCHARD: I have much pleasure in seconding this motion. If any of the visiting delegates looked out of the windows as they came through here they would see the land where the water had been applied. There is a mighty lot of dry land here and instead of having a placard "For the land's sake, give us more water," I would say "For the land's sake, ask the Government to give us water."

CHAIRMAN: (Asks the convention to vote on the above motion and the result is that the motion is carried.)

MR. PETERS: I will read the next resolution.

Moved by A. S. Dawson; seconded by James White:

Resolved that the delegates of the Tenth Annual Convention of the Western Canada Irrigation Association do express their sincere thanks for the admirable entertainment and the much appreciated hospitality that has been extended to them during their stay in the city of Kamloops.

Resolved that our thanks are hereby extended to Chairman Brown, Secretary Lawrence and the Local Board of Control, for the efficient manner in which they arranged and saw to the comfort and welfare and the entertainment of all visitors and delegates.

Resolved, that the thanks of this convention are hereby extended to His Worship Mayor Tyrrell and the members of the City Council, and to Alderman Johnstone and the Executive of the Board of Trade of Kamloops for their hospitality.

Resolved, that the thanks of this convention are hereby extended to the Medical Superintendent and Mr. Strachan, of Edward VII. Sanatorium, for the entertainment and hospitality shown to the visitors and delegates at the Sanatorium and Alexandra Ranch.

Resolved, that the delegates to the Tenth Annual Convention of this association hereby express their appreciative thanks to the members of the Fire Department of the city of Kamloops, who, under the direction of Fire Chief McKay, gave as a feature of our entertainment an excellent drill on Tuesday; and that we compliment

them on their agility and ability and further compliment the city of Kamloops upon having such an up-to-date apparatus so efficiently handled. (Loud applause.)

CHAIRMAN: Apparently those resolutions are carried without further vote. I declare them carried unanimously.

MR. PETERS: The next is a motion as published on the official call, which is as follows:

1. To add after paragraph 9, article VII, section I, two new clauses as hereunder:

"The Comptroller of Water Rights of British Columbia and one delegate from the Water Rights Branch of the Department of Lands."

"The Chief Engineer of the British Columbia Hydrographic Surveys."

So that this paragraph will now read as follows:

"The Dominion Commissioner of Irrigation and two delegates, one from the Irrigation Branch and one from the Hydrographic Surveys Branch of the Irrigation Department.

"The Comptroller of Water Rights of British Columbia and one delegate from the Water Rights Branch of the Department of Lands.

"The Chief Engineer of the British Columbia Hydrographic Surveys."

2. To add to paragraph 17, article VII, section I, the words "The Dominion Superintendent of Irrigation and the Dominion Superintendent of Water Powers."

So that this paragraph will now read:

"The Dominion Superintendent of Irrigation, the Dominion Superintendent of Forestry, the Dominion Superintendent of Water Powers, and the Chief Forester of British Columbia."

CHAIRMAN: You have heard the resolution. All in favour say "Aye."

To the contrary?

I declare the resolution carried. That ends the resolutions unless some lady or gentleman has anything further to bring forward.

MR. BROWN: This evening, at half past seven, there will be cars at the Leland Hotel. You have been riding around the country so far, but we now want to show you the city. The Superintendent of the Old Men's Home is very anxious for you to see the garden there. If any of you are machinists, mention it to the car driver and he will take you to the power plant of the city of Kamloops, which is rated by experts as second to none in the Dominion. After the trip is over you will be welcomed at the theatres in the city, and the only price of admission will be the showing of your badge. (Applause.) I would also remind you of the programme for to-morrow morning.

CHAIRMAN: The next item on the programme is the selection of the next place of meeting.

MR. WILLIAMSON: (Speaks as to the invitation of the town of Maple Creek for the next place of meeting.)

MR. AULD: (Also speaks as to the invitation, which is received with applause.)

Mr. Fairfield stated that he had been one of a number from Lethbridge who were to invite the convention to meet at that city next year, but as he appeared to be the only one left from Lethbridge he would withdraw in favour of Maple Creek. (Applause.)

MR. BROWN: I would now make the motion that we meet in Maple Creek next year.

MR. FAIRFIELD: I would second that motion.

CHAIRMAN: It has now been moved by Mr. Brown and seconded by Mr. Fairfield that this convention meet next year in Maple Creek, but before the motion is voted upon I think Mr. Biker, of Nelson, would like to say a few words.

MR. BIKER: I have just a few words to say and that is, I am here as the representative of the Mayor and city of Nelson, which is very much interested in the doings of this convention, and all I wish to say now is that we certainly invite this convention to meet there the year after next. (Applause.)

CHAIRMAN: The motion is ready to be voted upon.

After a vote was taken the Chairman declared the motion was carried.

CHAIRMAN: The next item is the election of officers. The list of officers suggested by the Committee is as follows:

Honorary President—Honourable W. J. Roche, Minister of the Interior, Ottawa, Ontario.

President—Honourable W. R. Motherwell, Minister of Agriculture, Regina, Saskatchewan.

First Honorary Vice-President—Honourable Duncan Marshall, Minister of Agriculture, Edmonton, Alberta.

Second Honorary Vice-President—Honourable W. R. Ross, Minister of Lands, Victoria, B.C.

First Vice-President—Honourable Senator H. Bostock, Ducks, B.C.

Second Vice-President—G. R. Marnoch, President, Board of Trade, Lethbridge, Alberta.

EXECUTIVE COMMITTEE

Chairman—F. H. Peters, Commissioner of Irrigation, Calgary, Alberta.

R. G. Williamson, Maple Creek, Saskatchewan.

W. D. Trego, Gleichen, Alberta.

A. S. Dawson, Chief Engineer, Department of Natural Resources, C.P.R., Calgary, Alberta.

W. E. Scott, Deputy Minister of Agriculture, Victoria, B.C.

Jas. L. Brown, Kamloops, B.C.

Jas. Johnstone, Nelson, B.C.

F. E. R. Wollaston, Vernon, B.C.

Moved by Mr. Porter; seconded by Mr. Carruthers:

That the list of officers as read by the Chairman be adopted.

After the vote was taken, the Chairman declared the motion carried.

CHAIRMAN: That concludes the programme, and I think I may be allowed to congratulate the convention on the very excellent papers and addresses listened to and the discussions carried on. I think we should be very thankful to the gentlemen who have come here to address us and I know it will be of very great help to us. I only regret that more of the farmers in the local districts just outside of here have not attended the meeting as we would have liked them to.

MR. WOLLASTON: I would like to speak to you from the point of the ordinary delegate. To many people who attend conventions like this, the Secretary is more or less a nonentity and most people know nothing about him or his work. Mr. Rankin said the other night that at the first convention he attended he made good friends at Kelowna. Mr. Rankin has attended five conventions, three of them in the prairie country and two in British Columbia, and those two being held in the Okanagan district, and I do not think there have been better conventions. I think in the Okanagan country we have a very special interest in Mr. Rankin, and speaking for the people of that district I wish him every success and hope he will come back to us. Mr. Rankin's title is Permanent Secretary, and it strikes me that that is a life sentence. We should give him leave of absence so that he can come back to us. When Mr. Rankin gets over to the trenches he will find other irrigators there. Some have attended other conventions. There are some who have gone who will not come back to us, but we hope and pray that Mr. Rankin will come back to attend once more to the work of this association. We should all do our best while Mr. Rankin is away to boost the Western Canada Irrigation Association, so that when he comes back and attends our convention he will say that it is the best he ever attended. I would now call for three cheers and a tiger to Mr. Rankin.

The convention then sang "For he's a Jolly Good Fellow."

MR. RANKIN: I thank Mr. Wollaston very very much and also all the other delegates at this convention. I would like to say that one of the most pleasant recollections that I will carry away is the fact that Mr. Auld has come to the convention representing the province of Saskatchewan and has made the promise that the Government will give us a grant towards our next convention, and nothing could have given me so much pleasure. I will now lead in singing

GOD SAVE THE KING!

The final session of the Tenth Annual Convention of the Western Canada Irrigation Association was held at the Railway Station, Kamloops, at 8 a.m., Friday, July 28, to meet H.R.H. the Duke of Connaught and of Strathearn, K.G., etc., etc., Governor-General of Canada.

On arrival of the vice-regal train, His Royal Highness very cordially greeted Honourable Senator Bostock, who, commenting on His Royal Highness' well known interest in all matters pertaining to agriculture, formally asked him to become the

patron of the association. His Royal Highness having graciously agreed and accepted the patron's badge, the latter was fastened to his coat by the Local Secretary.

Several ladies were then presented, who asked the acceptance of bouquets of flowers for the Duchess and Princess Patricia. Then followed the presentation of the Executive of the association, with each of whom His Royal Highness shook hands.

His Royal Highness then turned to a line of wounded soldiers returned from the front, to each of whom he spoke most sympathetically, enquiring of their service and wounds. On being told that a number who had been gassed were at the King Edward Sanatorium, not sufficiently recovered to be present, His Royal Highness desired a kindly message of sympathy to be sent them.

This informal ceremony concluded, His Royal Highness was heartily cheered as he boarded the train, which slowly drew out of the crowded station to the singing of the National Anthem, His Royal Highness smilingly bowing his acknowledgment from the platform of the end car.

Senator Bostock then adjourned the convention *sine die*.

LIST OF PUBLICATIONS OF THE IRRIGATION BRANCH

Annual Stream Measurement Report, 1909 to 1914.

Annual Irrigation Report, 1906 to 1915.

Irrigation Surveys and Inspections Report, 1915; (1915-16).

Western Canada Irrigation Association Report (1st to 9th Convention).

International Irrigation Congress Report (1914).

Bulletin No. 1 (Irrigation in Saskatchewan and Alberta).

Bulletin No. 2 (Alfalfa Culture).

Bulletin No. 3 (Climatic and Soil Conditions, C.P.R. Irr. Block).

Bulletin No. 4 (Duty of Water Experiments and Farm Demonstration Work).

PAMPHLETS:

Address by Mr. S. G. Porter; "Practical Operation of Irrigation Works"; Extract from W.C.I.A. Report, 1914.

" " Dr. Rutherford; "Inter-dependence of Farm and City"; Extract from W.C.I.A. Report, 1914.

" " Mr. Don H. Bark; "The Actual Problem that Confronts the Irrigator"; Extract from W.C.I.A. Report, 1914.

" " Mr. Don H. Bark; "Practical Irrigation Hints for Alberta"; Extract from W.C.I.A. Report, 1915.

" " Mr. Don H. Bark; "Alfalfa Growing"; Extract from W.C.I.A. Report, 1915.

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DEPARTMENT OF THE INTERIOR OF CANADA

Hon. A. MEIGHEN, Minister; W. W. CORY, Deputy Minister

Irrigation Branch—E. F. DRAKE, Superintendent

REPORT OF THE PROCEEDINGS OF THE ELEVENTH ANNUAL CONVENTION OF THE WESTERN CANADA IRRIGATION ASSOCIATION

HELD AT

MAPLE CREEK, SASKATCHEWAN

August 1, 2 and 3, 1917

Published by the authority of the Hon. A. MEIGHEN,
Minister of the Interior.

OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1918

of the practical side of irrigation, but I have come in contact with it in Western Canada and the United States to some extent and also have acquired some knowledge through what I have read of irrigation.

It may be of interest to state that over half of the world's arable area has insufficient moisture to produce crops each year. That is, nature has to be helped by artificial means to produce crops on over half the world's arable land. So, the supply of water is in many cases the limiting factor to successful agriculture. In some lands, such as European countries, where the farms are of a very small area, some consisting of but one, two or five acres, land is the limiting factor to successful agriculture because the smallness of the area of the farm precludes the use of labour-saving machinery.

Some little time ago, before the world devastating war commenced, I went through parts of Europe and I saw farms so small indeed that it seemed an athlete could readily jump across some of them. Some of us who were in this country twenty or thirty years ago will remember when the distance from market was the limiting factor. A man twenty or forty-five miles from markets can handle only a certain amount of grain, as it will take too long to haul a large crop to town, so that in some agricultural districts distance is the limiting factor. It may be that transportation by rail or water is the limiting factor. For instance, in Australia at the present time ocean transportation is the limiting factor to wheat growing. Then in other districts the question of fertility is the limiting factor. None of these, however, to any extent, is the limiting factor to field agriculture in Western Canada. What is it then? We cannot say generally it is lack of transportation or the distance from market or the question of fertility, but usually it is the question of water supply for purposes of field agriculture.

We have two ways of supplementing nature and making the farmer more independent of cloud moisture. One is by irrigation and another is by dry farming. Now, as I have just stated, over fifty per cent of the arable area of the world has to be helped out by some one form or application of either of these methods. In a year like this and the year 1914 we have had to rely upon sources of water supply other than cloud moisture in order to ensure a successful crop; but despite this fact I have heard practical men say that they were not going to farm for a dry year. They were going to farm for a wet year and take a chance of it being a dry season. I think that is a fallacious practice to follow in this or in any other similar country. Some of the old-timers will remember that the outstanding dry years were 1886, 1889, 1900, 1910, 1914, and the year we are in (1917), and in seasons such as those it is impossible to grow an average or paying crop without irrigation or storing up moisture from the previous year. This year has again demonstrated the fact that we have to resort to one of these devices to assist nature in developing the agricultural resources of this land. I have not been able to decide that these dry years come in cycles. I do not think they come with any regularity. The point is, we should cultivate our land so well as to be prepared for the worst and then hope for the best. The last time I was here in Maple Creek at a convention there arose a controversy over the relative merits of irrigation and dry farming. Now, I think there should be none. They both aim to make the farmer more independent of the cloud moisture in the particular crop year he is in.

Now, I understand some people object to irrigation because it means a lot of work. The question of excessive work does not appeal to the western man. Some of us left our homes in the eastern part of Canada, not because of irrigation, but for the reason that we did not like the constant work and chores entailed on a live stock farm. We came west expecting to work less. But I have found no country under the sun where if you are to succeed in agriculture it does not mean constant work and work applied properly and at the right time. And if irrigation gives the desired results this objection may be ruled out. Then there is the question of cost to which some people object in connection with irrigated lands, but if the profits are relatively greater this objection is unimportant. Another objection is, that going over

the irrigation ditches wrecks the farm machinery. I think they get over this difficulty pretty well by levelling wherever possible. Then, I understand another objection is, that the water is too cold when taken direct from the rivers which have their sources in the mountains. This, however, has not been proven to be the case. On the contrary, the water from the great reservoirs should be quite warm enough by the time it is applied to the land, and I understand this has been demonstrated to be the case. Then, it is said that mineral deposits are brought down by the water to the soil. The western streams are, however, particularly free from such deposits. I have the testimony for this from many irrigationists. I am not going to say anything about the original cost of irrigation as I am not familiar enough with that phase and I will leave it to some others to discuss.

On the other hand, objections are heard to dry farming, We get crops only twice in three years, and in some districts only every other year. Then we have a large part of our land under summer-fallow—lying idle—and that makes farming more expensive. Then the process of summer-fallowing burns up the vegetable matter in the soil. The more we summer-fallow and keep the soil warm and open, the more we exhaust the humus and the nitrates. Unless these are returned to the soil our clay land will become harder and stiffer to work as time goes on. Another objection to dry farming is that it is conducive to soil drifting. The harder and stiffer the clay soil becomes and the less humus that remains in it the more it will drift the year after it is summer-fallowed. That is incredible to many people who think that only light land will drift. We find that heavy land after summer-fallowing will drift badly, and the soil which blows away is the richest and best of it. This drifting, however, while very serious, can be more or less overcome by right tillage and rotation methods.

Dry farming tends to extensive farming. It means holding a large portion of the land, even one-third of it, idle for summer-fallowing, if we are to farm successfully in dry districts. That, in turn, develops large farms but with sparse population and makes for expensive municipal government, expensive road construction, expensive construction of bridges, schools and churches. All these local conveniences owing to the sparseness of population in most districts are more expensive than they would be to the average farmer if we had closer settlement and larger population. On the other hand, irrigation farming tends to intensive development, more grass, more pasture, more hay, more live stock, possibly more fencing, more tree culture, smaller farms, more population. You will agree that this is a strong argument in favour of irrigation and here let me say that no matter what our success may be on the open prairie it falls far short of home building if we do not plant trees. One of the loneliest sights I can imagine is a prairie home without trees. And with proper tillage we can grow them abundantly.

These are some of the conditions which irrigation should produce and the more it increases the live stock, the more profitable in the end will be our farming. I know that this picture may not appeal to the wheat-grower who comes to us with large ideas and wants to farm by the township, but far more of us are trained to farm on a comparatively small scale. Farming successfully on a large scale depends mainly upon two things. One is a good knowledge of mechanical power, and the other is how to get the best results out of a gang of farm labourers and many of us are not gifted in either of these two important essentials, hence a smaller farm may suit our requirements much better.

No matter how enthusiastic you irrigation or dry farmers may be, I think you will agree that probably the best method to follow, where possible, is to combine both irrigation and dry farming on the one farm. That removes an objection some people have to some of the farms now under irrigation in Western Canada where they say one can only irrigate a portion of the farm owing to its undulating character. People who have spoken to me about this tell me that the best system is to have about fifty per cent under irrigation and the remainder devoted to dry farming methods. The irrigated area then is devoted to the growing of hay, grass, alfalfa and vegetables. I

wonder if any of the persons here think we can grow alfalfa or grass every year on the same land under dry farming methods. We can grow a particularly fine crop of hay the first year under dry farming methods, but I do not think the greatest dry farming enthusiast will claim that he can grow grass or hay crops successfully year after year on the same field. This is not naturally a hay country. The precipitation is too light. The average precipitation in this particular district is only about fifteen or sixteen inches per year. Consequently, to grow hay or pasture to the greatest success in consecutive years you must have irrigation. Then the other fifty per cent of your farm may be devoted to dry farming methods. I do not think that irrigationists claim you can grow better wheat on irrigated farms. If, under such conditions, you use your irrigated land for growing wheat, I believe you are not making the best use of your opportunities. Consequently, a man situated so that half of his farm is capable of irrigation and half for dry farming is in a position to have the ideal conditions for successful diversified agriculture.

A word as to methods, and this applies equally to dry farming and irrigation. It seems to me that all the evidence points to the fact that we must take more care with our farming practice. But, if there is one reason why we should farm well in times of peace, there are ten reasons why we should farm better in times of war. Take the fact that farmers have been getting $2.40 for their wheat. That is so much more than we dreamed of years ago that we are now attempting to put all the ground we possibly can into the growing of wheat and we have been doing it all too generally and without adequate preparation. If we continue this practice I fear we are later going to regret it. If this crisis should only last one year, we might afford to throw all our efforts and all our land into the raising of wheat, but since no man knows when the war will be over, we should take more care than we have ever taken to have our work done properly and at the right time.

So far as I am aware, nearly every person who has been discussing the subject of after-the-war prices holds the view that low prices are going to prevail when the war is over. I do not see how any one is justified in coming to that conclusion. With the present methods of cultivation and the practice of growing as much as possible the soil is naturally depleted and deteriorated and the yield becomes lighter. Therefore, the price of grain should remain high for several years after the war.

The land in Europe had to be fed up almost as carefully as a milch cow and it is not being fed up to-day and, therefore, for the want of artificial fertilizers and for the want of ordinary farm manure, because live stock is being also depleted, the land in Europe is yearly getting in a poorer condition to raise crops. In this country it will not work out in the same way simply because the question of fertility is not yet a limiting factor. But in the older districts, the condition of our soil is going from bad to worse from weed infection. You will find fields in the newer localities half of which is native quack grass on account of continued stubble cropping. So far as I can see, therefore, with the present agricultural methods prevailing, due partly also to labour shortage, agriculture will be in such a rundown condition generally by the time the war is over that it will take a long time afterwards to again attain our maximum average production. These conditions will naturally affect supply and prices and the man who farms carefully and well should be well rewarded during the next few years. Altogether too many people are scrambling into grain growing just now and putting more land in wheat than they can rightly cultivate. They think that they will make sufficient while high prices prevail to tide them over the days when the prices will be low. This is an absolutely wrong idea and I do not see how that conclusion is in the least justified. We want maximum production and many are striving to attain it by boosting the acres rather than by boosting the bushels. Practise continuity in farming as in other callings. Do not farm with the idea that you are going to farm only for to-day. Keep firmly in mind that only with continuity in farming shall we attain the best degree of production and success.

I have a suggestion I would like to make before I conclude. The matter of establishing illustration farms in irrigated areas is one which I think you should have the Government deal with. As you probably know, the Federal Government has been establishing illustration farms of about forty acres under the direction of Mr. Grisdale. I want to express my appreciation of this work. We began similar work in 1914, before the outbreak of the war. Our district representatives were supplying certain farmers with seed and giving instructions both written and verbal on how to meet conditions for just this sort of year. However, most of our young men enlisted and went to the front and we have only one illustration farm left now at Battleford. I regret that for the lack of men and money we have not been able to develop this work as we had planned. However, the Dominion Government also is doing this class of work and has an illustration farm at Shaunavon, one near Cabri, and one in this district, and many others elsewhere. But these farms have been located in the dry farming districts to teach dry farming methods. There are also the larger experimental farms like Indian Head, Scott, and the Lacombe Farm. These also were started to show how dry farming should be conducted. In Lethbridge, I believe, Mr. Fairfield has been instrumental in having the experimental farm at that point, or at least a portion of it, worked under irrigation conditions. My suggestion to you would be that the Dominion Government, having greater resources, should, as a national movement, establish at least two or three experimental or illustration farms in irrigated districts.

Years such as this demonstrate the value of irrigation, but what we most need is expert advice and demonstration of the methods, which after due experimentation, have been found of greatest value for irrigation farmers to follow. If, therefore, the Government would take up this work and experiment and demonstrate for men who have not the practical knowledge or experience of irrigation under our conditions, their efforts would certainly result in much good. (Applause.)

I now call upon the Acting Secretary, Mr. Stead, to read his report.

SECRETARY'S REPORT.

Mr. STEAD: Mr. Chairman, Ladies and Gentlemen,—In presenting to you the secretary's report of the affairs of the Western Canada Irrigation Association for the season 1916-17, it is appropriate that reference should be made to the satisfaction felt by the executive, and by all who have the interests of irrigation at heart, that the province of Saskatchewan has found its irrigation interests to be so great as to justify it in inviting and entertaining this convention at Maple Creek.

As is well known to the members of this association, the permanent secretary, Mr. Norman S. Rankin, is enlisted with the military forces of Canada. At the Kamloops Convention Mr. Rankin tendered his resignation in order that he might carry out his military purposes, but the executive, very wisely, I think, declined to accept his resignation, granting him instead leave of absence for such period as might be necessary, and in order that the work might be carried on uninterruptedly I was asked to act as acting secretary during that period.

RESOLUTIONS.

At the convention held at Kamloops, B.C., July 25, 26 and 27, 1916, certain resolutions were passed, as will be found quoted on page 194 and following pages of the Report of the Tenth Annual Convention. These resolutions were duly drawn to the attention of the authorities and persons interested therein, and acknowledgment thereto received from the proper parties.

ANNUAL REPORTS.

Owing to the fact that the report of the Bassano Convention was not available for distribution until after the Kamloops Convention, two annual reports have been distributed within the last twelve-month period. These reports are sent to the delegates in attendance and to a mailing list of farmers and others known to be interested in irrigation, and also to the leading newspapers throughout the West.

ORGANIZATION.

The officers elected at the Kamloops convention have continued in office during the year with the exception of the Hon. W. R. Ross, who was elected to the position of second hon. vice-president, but who subsequently resigned with the suggestion that his successor in the office of Minister of Lands of the province of British Columbia, Hon. T. D. Pattullo, should be appointed to this position. With the concurrence of the executive this was done.

Mr. F. H. Peters, Chairman of the Executive Committee, also found it necessary to tender his resignation as chairman of the committee, on account of other duties, and Mr. R. G. Williamson was elected chairman in his place.

In order to effect a local organization at Maple Creek, Mr. Peters and the acting secretary attended a meeting in that town on March 16, when the following Board of Control was elected by a representative gathering of business men and farmers of Maple Creek district:—

Chairman, P. Chevalier, Mayor of Maple Creek.

Vice-Chairman, D. J. Wylie, M.L.A.

Secretary, G. S. Herringer.

Chairmen of Committees:—

Mat Fleming.
W. J. Redmond.
John Dixon.
C. H. Stockdale.
R. H. Hodson.
R. G. Williamson.
F. H. Auld, Deputy Minister of Agriculture, Regina, was appointed ex-officio a member of the local Board of Control.

A meeting of the executive committee was held at Banff on Friday, August 27, to prepare a programme for the Maple Creek Convention and for other organization purposes. At this meeting Col. C. S. McInnis and R. J. Burley were appointed to represent the association at the meeting of the International Joint Water Users' Commission at St. Paul in May.

Resolutions of appreciation of the action of the permanent secretary, Mr. Norman S. Rankin, in enlisting for service at the front were passed and copies forwarded to Mr. Rankin and also to Mrs. Rankin.

PUBLICITY.

Every effort has been made to keep the work of the association and general interests of irrigators in Western Canada before the public through the press. As the addresses delivered at the annual conventions are usually too lengthy to be reprinted in full in most newspapers, the secretary undertook to abbreviate a number of them and to obtain circulation for them in that way. In addition to regular articles a stream of short items was provided to the newspapers dealing with different

phases of the association's work, and drawing attention particularly to the present convention at Maple Creek. In this connection the association is deeply indebted to the press for the generous publicity given to this convention. Clippings on file, which are available for your examination, show that a circulation of 917,840 has been secured, and in addition to this, it is always the case that many items are published of which no clippings are secured.

The official call was mailed late in June to a list of over 2,000 irrigators and others interested, and was followed by a set of three follow-up post cards prepared from original drawings made for the purpose. The cards were also distributed widely to the press and drew forth considerable comment. Another form of publicity used was the distribution to the newspapers of cuts, which had been made at the expense of the association, showing photographs of various speakers who had undertaken to assist in the programme. These were widely published, always with some comment on the Maple Creek Convention and the work of the Western Canada Irrigation Association.

FINANCIAL STATEMENT.

I have pleasure in submitting herewith the financial statement of the association for the period since the last audit, at the time of the Kamloops Convention, which shows the association to be in a favourable position financially.

Receipts.

On hand as per last audit	$502 85
Refund from emergency cheque drawn for petty expenses at Kamloops	4 39
Alberta Government grant	500 00
Saskatchewan Government grant	500 00
British Columbia Government grant	500 00
Dominion Government grant	500 00
	$2,507 24

Disbursements.

G. A. Morrison, official report of Kamloops Convention.	$176 25
Expenses paid speakers attending Kamloops Convention.	121 35
Cartage	0 78
Rubber stamp	0 30
Expenses of executive at executive meeting	117 35
Minute book	3 50
Grant to local Board of Control, Maple Creek	250 00
Official calls	49 70
Follow-up post cards, letterheads and envelopes	99 05
Art work for postcards	15 00
Art work for official call	9 00
Cuts for postcards and official call	28 10
Emergency cheque for expenses at Maple Creek	100 00
Acting secretary's salary	499 95
	$1,470 33

Total receipts	$2,507 24
Total disbursements	1,476 33
Balance on hand as per certificate of Bank of Commerce, dated July 28, 1917	$1,036 91

AUDITOR'S STATEMENT.

This is to certify that I have examined the books and vouchers of the Western Canada Irrigation Association for the period from July 27, 1916, to July 31, 1917, and I find the foregoing statement of receipts and expenditures to be correct, and the balance on hand to be $1,036.91 (one thousand and thirty-six dollars and ninety-one cents) as per the certificate of the Bank of Commerce, copy of which is attached.

(Sgd.) GEO. A. MORRISON,
Auditor.

RESOLUTION OF CONDOLENCE.

Upon receipt of the news of the death of Captain Bostock, son of the first vice-president, a resolution was prepared and forwarded to Hon. Hewitt Bostock expressing the sympathy of this association with him and his family in their bereavement.

INSTRUCTION IN AGRICULTURAL ENGINEERING.

In view of the need of a certain amount of engineering skill and knowledge in modern agriculture, a communication was prepared and sent, under the signature of the chairman of the executive, to Dr. Tory, Dean of the University of Alberta, laying stress upon the necessity of this particular branch of education.

On motion the secretary's report was adopted.

The CHAIRMAN: Now we have the appointment of two committees. I will read the names suggested. For the Credentials Committee: Messrs. Marnoch, Huckvale and Williamson. For the Resolutions Committee: Mr. F. H. Peters, Chairman, Prof. Fairfield, William Pearce, J. L. Brown and James Johnstone.

Carried.

Mr. MARNOCH: I think that before we close this morning we should express our appreciation to the president who has come here and addressed us. One of his valuable suggestions is for continuity in farming. Referring more to the Lethbridge district, I remarked to a friend that the crops appeared to be short in comparison with the years 1915 and 1916 and I made the remark that the feeling throughout the country when the crop is large is expressed in these terms, "the country is God's own country" and in another year "the country has gone all to h—". I would like to follow up Mr. Motherwell's suggestion with reference to continuity in farming and that is that we should all want to make it the best country.

Mr. Motherwell also made another valuable suggestion and that was as to the best use we should put our land to. He suggests a farm capable of being operated 50 per cent in irrigation and 50 per cent in dry farming methods. That raises a very broad question in this regard, that any extensive irrigation scheme requires very considerable expenditure. You have got to arrange that expenditure so that you can show returns for it. It is difficult to devise means whereby if you put down a considerable expenditure in irrigation ditches you can work the two methods. You desire to spread the water over as large an area as you can. Up to the present time our big irrigation schemes have been devised so that the land to be served with water

is that land which is most readily brought under water. If we are really going to make use of the water and make it fit in with Mr. Motherwell's suggestion so that every one can get some water for hay crops, the question will be just how we are going to fit the two things in. There is also another exceedingly valuable suggestion on the part of our President and that is with reference to having the Government operate an illustration plot under irrigated conditions in the irrigated districts. I would therefore express a motion of appreciation to our President. (Applause.)

CHAIRMAN: A gathering like this really warrants a man getting up and doing his best. What I have done this morning has been in an informal way and I am delighted to think it has met with your appreciation. I feel that this whole question of water supply is such that the question has arisen in my mind if the irrigation and dry farmers could not get nearer together in their conventions than they have done in the past. The reason that this has not been done is, I believe, due to the fact that there has been some little antagonism in the past. I would think that any one who endeavours to make the best use of the water that would ordinarily run off his land and utilize it for his crops is irrigating. (Applause.)

AFTERNOON SESSION—WEDNESDAY, AUGUST 1.

CHAIRMAN: Professor J. Bracken, Field Husbandry Department, University of Saskatchewan, will address us on "Alfalfa."

Prof. BRACKEN: It has always been a pleasure to me to meet the dry farmers of the Maple Creek district. I cannot say that it is as great a pleasure to meet you "wet" farmers for the reason that I do not know your problems so well. Most of what I shall say to-day will apply only to dry farming conditions but some of our practices may probably apply to conditions under the ditch as well. I have had no experience, however, with alfalfa under irrigation.

I shall not take time to tell you how good alfalfa is. In this age we assume that every man interested in agriculture knows that it is the oldest forage plant and that it is the most valuable pound for pound of all forage crops. Wherever under dry conditions a ton and a half per acre can be produced it is the most valuable crop a man can grow, and wherever more than two tons can be grown under wet conditions no other crop can compare with it.

At Saskatoon during the past six years we have grown 125 strains of alfalfa secured from many different parts of the world. They are of three distinct types—(1) The yellow blossom. (2) the purple blossom, and (3) the so-called "variegated" alfalfa, which is supposed to result from a cross between yellow and purple.

The yellow is the hardiest, but has habits which may prevent it from being introduced in most systems of agriculture. It grows rather flat on the ground and the seed shatters badly when ripe.

The variegated has under our conditions proved the most useful. The hardiest varieties of this type are Grimm and Baltic. All the yellow ones lived through last winter, which was the hardest winter on alfalfa we have ever had.

One can grow the common sort and have it live through many winters, but occasionally it will fail and in doing so give a bad reputation to all varieties. Turkestan, the hardiest purple blossomed sort, killed out where it produced seed last year, but where it was grown for forage, some of it lived. Practically all the other alfalfas except the yellow, the Grimm and the Baltic killed out more or less.

I meant to have a dozen photographs of this crop with me this morning. They have not yet arrived, but I expect to have them to-morrow, when those who are interested can see them. This year we had twice as large a yield from alfalfa sown in June of last year as we did from that planted in July. In our tests alfalfa was

planted every ten days, starting with the 30th of April and ending the 30th of July. Alfalfa sown in June, our rainy month, gets better established. We think it should be sown in the rainy season. It cannot be sown earlier owing to the danger of spring frosts. It should not be sown later because it will yield less.

With regard to the amount to sow. Under irrigation and humid conditions you sow a larger quantity. We find it advisable to use less seed. When we sow thinly we obtain the best results. Five pounds of seed to the acre equals twenty-five seeds to every square foot of land. As little as three pounds per acre is sufficient for seed production when sown in 30 or 36-inch rows. Under irrigation conditions I realize you will sow more than that, but that point will be dealt with by those who will speak after me. When sowing broadcast we use ten to twelve pounds to the acre, but, of course, that depends upon the condition of the land. If the land is in perfect condition, less seed will be necessary; if in poor condition at least that amount is advisable.

Regarding inoculation I do not see very many practical farmers here this afternoon or I would go into this question more fully. Every student of forage crops knows inoculation for alfalfa is necessary. For two thousand years men have known that crops following a legume yield are better than when following a non-legume. But not until some forty years ago did they know why. Nitrogen is the most valuable fertilizing constituent in the soil. There are seventy million pounds of nitrogen in the air over every acre, or enough to grow 30 bushel crops of wheat every year for a million years; and we can use that nitrogen if we grow alfalfa and inoculate the soil. When alfalfa is inoculated with nitrogen-fixing bacteria, the bacteria draw upon the nitrogen in the air and make it available to the plant. Inoculation has given us an average yield of a thousand pounds more hay per acre. In some places men have gotten a bigger increase even than that. Our fields that were not inoculated killed out last winter, while those that were inoculated lived through. Under most conditions inoculation increases the yield and it makes the plants hardier and more able to withstand winter conditions.

No man operating on irrigated land thinks of growing alfalfa in wide rows, but some dry farmers are coming to think that if they are to grow alfalfa at profit they may have to grow it in wide rows. We have grown it for six years in 6, 12, 18, 24, 30 and 36-inch rows and the average yield is higher from the 30 and 36-inch rows than from any of the closer rows. The average difference between the 36 and 6-inch rows is a quarter of a ton to the acre. The cost of production in the wide rows was greater due to the intertillage necessary, but the added cost was met by the increased yield. While money is high and labour is high and equipment is high in price and while land is cheap, I question whether it is economical or wise to grow alfalfa in wide rows, but when conditions change it will in our opinion be wiser on dry land to grow it in wide rows than in close ones.

In the 36-inch rows sown at 3 pounds per acre we had a yield of 116 pounds of seed while in the 6-inch rows sown at 15 pounds to the acre the yield was 30 pounds of seed. From the point of view of seed production there seems to us only one method of procedure and that is to sow alfalfa in wide rows, at least 30 inches apart and cultivate them as necessary to control weeds.

In Saskatoon, where conditions are more severe than here, we had, in this our driest year, over a ton of hay per acre in the first cutting. Of course, it has been looked after—perhaps better than the average man can look after it. We recommend sowing alfalfa in rows only for dry lands or for seed production, but not for the irrigation farmer.

In regard to preparation of the soil, the worst enemy to alfalfa is the so-called blue-joint or quack grass. Alfalfa cannot compete with quack, although it may with other weeds. Neither can it compete with sweet grass. In irrigated areas, you have much of the so-called blue-joint. When this is present your soil preparation will have to be carefully done. We get best results from seeding on corn ground, next best

after potatoes and next on fallow, although good stands can be obtained at a much smaller cost on well worked down spring or fall ploughing. We try to sow it in the rainy season in order to get as quick a start as possible and so that the weeds will not get a chance to smother the slow starting alfalfa seedlings.

Just a word in regard to the first year treatment. As I mentioned before, last winter was the worst winter for alfalfa that we have ever had. Where we had any fall growth last year the alfalfa lived, but where it was cut late in the fall it all died. If we cut late in the fall, it lowers the production and endangers the life of the crop. We believe that alfalfa should be clipped back if there are weeds present, but if there are none we think it should be left uncut. The leaves of a plant are its stomach and if we cut off the leaves it cannot grow so well no matter how much we may hope it will "root" better. If alfalfa is to be clipped off it should be done early.

We have disced and renovated alfalfa land every season for the last five years and we find it keeps the field in a better condition, but decreases the yield except where the land bakes or where grass is present. Where discing improves the soil more than it hurts the plants, it is a good practice. A renovator is like a disc except that it has spiked teeth instead of the disced plates. It is an excellent implement for "renovating" grassy fields.

The important questions of cutting, curing and marketing alfalfa hay I shall leave to the other speakers who are more familiar with these phases of alfalfa culture than I am.

In conclusion let me emphasize the practices that will prevent winter killing:—

First, use hardy varieties; second, do not cut the crop too late in the fall, leave a litte growth to hold the snow and protect the plant; third, inoculate the seed or the soil; fourth, if you are afraid of winter-killing do not grow for seed because seed growing is harder on the plant than hay production. One other point has impressed itself upon me since coming here and that is, do not irrigate too late in the fall.

I wish to refer to one other point before taking my seat and that is the lack of good seed. There is a demand for good, clean seed of the hardy varieties. I believe we can grow seed very profitably on our warm, dry lands in wide rows. Six points summarize our information on successful seed growing:—

First, use Grimm or Baltic. For sixty years Grimm has been developed by natural selection in Northern Minnesota and it has been grown here very successfully.

Second, sow in wide rows approximately 3 pounds to the acre or less.

Third, use warm soils. Heavy soil produces more forage under our conditions, but the warm soils produce more seed.

Fourth, inoculate and cultivate.

Fifth, use dry land. We have not had any irrigated land to grow our seed on, but from our observations we believe that dry land is likely to be better for seed production.

Sixth, do not cut the first crop for hay. In only one year out of five have we got mature seed at Saskatoon from the second crop, and even in that season the quality of the seed from the second crop was inferior and the yield only 82 pounds as compared with 116 pounds from the first crop. Our season at Saskatoon is not long enough to permit us to use the second crop for seed. (Applause.)

CHAIRMAN: Professor W. H. Fairfield, Dominion Experimental Station, Lethbridge, Alberta, will address us on alfalfa.

Prof. FAIRFIELD: Alfalfa is so peculiarly adapted to irrigation that it deserves and receives a great deal of attention in all irrigation projects in every part of this continent. There are a number of reasons why this is so, but to begin with, and as Prof. Bracken pointed out, it is an extremely rich and valuable plant, rich as a fodder and valuable as a soil renovator. Although it is a sub-tropical plant it has

great adaptability and when we bring it to the northern latitudes the amount of growth we get from it is governed entirely by the length of the season, assuming of course that it has an ample supply of moisture, and this we can supply with irrigation. As it is a semi-arid plant naturally it can stand a drought for one, two or three months or may be a year, and when the moisture comes it grows just as fast as if the drought had not occurred. That is one of the reasons why it is so peculiarly adapted to irrigation districts. We know in growing timothy that if moisture is not present in early May or June we do not get a crop. In alfalfa we just lose that period or any period where there is a shortage of water. When the moisture does come, the alfalfa comes on just the same as if it had not stopped growing.

We have reached the northern limit of alfalfa in the prairie of the Canadian Northwest. There is no question about this, although I am not assuming that it is not possible to bring it further north in some particular localities, such as perhaps to Peace River country and northern British Columbia. I firmly believe it has come to stay, although we are still as a matter of fact in an experimental stage in growing alfalfa in some districts in Alberta and Saskatchewan. A few years ago, you will remember, the corn belt was further south in the States than it is at present. Every decade has seen it brought nearer to the Canadian boundary so that now in certain localities in Western Canada it is possible to raise with profit some of the earlier sorts. They have accomplished this by finding suitable varieties and then adapting them to the shorter growing seasons. Just so are we going to bring the alfalfa belt north. As Prof. Bracken has pointed out, it will be brought about by the selection of hardy varieties. The importance of selecting these hardier varieties is illustrated by the winter-killing which has occurred in irrigation areas in Alberta during the last two seasons. If you will pardon me a moment in referring to local conditions at Lethbridge, I may say it has been growing for the last fifteen or sixteen years in the immediate vicinity of Lethbridge, around Raymond and Magrath, ever since water was brought down the A. R. and I. ditch. I know of one field sown in the spring of 1901 and that field is producing this year as good a crop of hay as any in the district, and has been producing crops continuously since 1901.

I am making my remarks apply particularly to the irrigated land. Until the winter of 1915-1916 I can honestly say that I have seen no winter-killing in the Lethbridge district that could not be attributed to some form of carelessness, such as to late irrigation or close pasturing or some such condition as we would expect to kill out alfalfa further south where there is no question as to its hardiness.

During the last two years there has been winter-killing and from reports there is some serious winter-killing in the Gleichen and Strathmore districts, but I believe Mr. Bark will be able to give us information as to this to-morrow morning. During the last two years in southern Alberta we have experienced more winter-killing in our trees and shrubs than we have ever noticed in the last ten or fifteen years. What would affect the growth of trees and shrubs will certainly affect the growth of alfalfa. I only speak of this in a desire to throw out a little hope, because the farmers in those districts that we speak of are becoming very much discouraged with alfalfa growing, but I am still confident that alfalfa can be grown there successfully, except on perhaps isolated farms or limited localities where conditions of soil are such as to make profitable growing of alfalfa somewhat doubtful.

The conditions that prevail in the Lethbridge district, that is the climatic conditions, are in my judgment about the same on east to Medicine Hat. Also on the main line of the Canadian Pacific railway east of Bassano and possibly Gleichen. West of that, however, the natural flora indicates that there is more rainfall and that the soil contains more humus than is the case in the drier areas. Those of us who are familiar with the climatic conditions in Alberta know that from a line drawn from Lethbridge to Gleichen it is much drier east of that line than west.

In alfalfa where we do meet with winter-killing the question of hardiness is of extreme importance. Prof. Bracken has touched on that and our experience is that

Grimm has given us the best results. I may say that we do not make much distinction between the Grimm and the Baltic. So far as I can learn the Baltic is merely a selection from the Grimm.

I want to add a word to what Prof. Bracken said in regard to the difficulty of obtaining hardy seed. Unfortunately there has been a great deal of seed sold under the name of Grimm that is not entitled to that name. Consequently when that seed goes to new districts or to beginners in alfalfa growing and they fail to make a success of it, they are inclined to damn the whole idea of alfalfa growing when they are not justified in so doing.

We have found that the best place to grow the alfalfa seed is on the dry land. It is common knowledge that alfalfa will not produce seed if heavily irrigated the season the plants are allowed to go to seed. It goes too much to leaf and stem and produces little seed. Consequently, the farmer on irrigated land will have to look to the dry-land farmer to produce most of his seed. We have grown it not only experimentally, but have gone into it on commercial lines to some extent in southern Alberta. The Canadian Wheat Lands Company, at Suffield, have about 3,000 acres in rows 3 feet apart. I had the privilege of going over this land last year, later in the season than this, and found only two or three hundred acres on which the plants had set seed properly. Whether it was on account of lack of insects to trip the blossoms or whether the climatic conditions during the season were not such as to favour the production of these insects or whether the season was too wet, we do not know. Last year, however, was unfavourable generally for the production of alfalfa seed. We must have dry, hot weather during the time the bloom is setting for seed. This year has been more favourable, but the excessive drought of the last three weeks has probably had some deteriorative effects on the filling of the seed as it has on other crops. To produce good alfalfa hay is very much more difficult than to make ordinary grass hay. With ordinary grass hay we can use labour-saving machinery to advantage gathering directly from the windrow to the stack. With alfalfa it is quite different. The food value of the alfalfa plant lies in the leaf. It is attached to the stalk with a slender stem. You can readily see that with careless handling a great many of the leaves will be lost and a great deal of the value of our feed will be gone.

Perhaps it is hardly the place to go into details as to this, but to overcome this we should watch very carefully and rake as soon as the hay is wilted sufficiently. After it has stood a short time in the windrow it should be put in small piles and cured, that is, do part of the curing in the cock. In this way if a rain does come before we can stack it instead of having to open up these piles and scatter them out and thereby lose some leaves and discolour most of it, we merely wait until the top of the pile is dry and roll it over and dry out the other part of the pile, and in a day or two we can start to stack again. In this way only part is discoloured, and the rest is left with the leaves and colour.

There has been one trouble or difficulty that the farmers in the Lethbridge district have met with in handling hay. The production of alfalfa hay is now becoming quite an industry as there are some 15,000 acres in alfalfa. In the beginning the farmers attempted to use the same kind of machinery as they used for hay with sweeps and an over-throw stacker. This was satisfactory providing the farmers cocked it up instead of stacking from windrow. However, these stacks were not made high enough and the hay settled rapidly and consequently with fall rains—and we are apt to have a great deal of rain in the fall—a lot of the alfalfa hay was hurt. After the season of 1914, when we had lots of hay, but had about a quarter or half destroyed by fall rains, the farmers started to put in stacking rigs either with a cable or with a mast and boom so as to be able to make their stacks 30 to 40 feet high, and this saved their hay, but in stacking it this way they made it 25 feet wide instead of 15 to 16 feet wide as before, consequently they did not have sufficient ventilation and the inside discoloured very badly, and although we had thousands of tons for feed in the Lethbridge district, yet it was hard to get "No. 1" hay in our district.

Some of our farmers were confident they would have a certain number of bales to sell, but after going into the stacks they found the alfalfa had been changed to a white or musty colour, so this year the farmers are attempting to do more or less ventilating with these stacks. That is, where the stack is 30 feet high, they run through the centre a wooden horse about 2 feet high, and put posts across so that there is an air space of about 2½ feet high running lengthways in the bottom of the stack. In this way they hope to overcome the difficulty in heating. You must remember we are in a sub-humid climate, not in a semi-arid climate as in most places where it is grown in the United States and where they do not have to take the same care as we do in cutting and they do not have to take the same care as we do in getting the quality out of the stacks. There is just one redeeming feature in this that appeals to me. It is that, if the hay in the stack becomes somewhat damaged, due to excessive sap in the hay, the palatability or digestibility of the hay is not decreased. The digestibility is increased, if anything. Although it prevents a farmer from selling such a large proportion of his hay after baling, it does not hurt the hay for feed, consequently it will have a tendency to make farmers in irrigated areas go more quickly into live stock than they would otherwise do.

I have made a few notes in regard to some points that we consider important in regard to seeding alfalfa, but Prof. Bracken covered that pretty well. I will only say a word or two supplementing or modifying one or two of his statements. I am speaking of sowing alfalfa on irrigated land and he was speaking of sowing alfalfa on dry land. We find that, although corn and potato land is ideal to sow alfalfa on, the man on irrigated land hesitates to do that. He would rather put a crop of grain in on such well-prepared land as it is all ready for the seed drill, and put a crop of alfalfa on it the next year. We find that if we have the moisture and the seed bed is well prepared, we can get the same results by sowing on stubble. We are assuming, of course, that a man is able to irrigate before the plants are suffering acutely. We assume that we will get enough rain to bring it up. We sow in late May or early June and irrigate the first season usually in July. We have found that, where we plough stubble it is apt to be a little too loose and open. Where we have stubble land free from grass the "stubbling in" method is satisfactory, and I may say that in drier portions of Alberta we are not apt to be bothered so much with the grass as we are in the portions where the rainfall is greater. Do not misunderstand me. I am assuming that the land has been properly ploughed the year previous, at least 6 inches deep, and is in good tilth, and on that land we can get better results by double discing than we could by ploughing, if it is free from grass. We found that where it is necessary to plough it should not be too deep, providing always that the lands have been ploughed to a good depth previously.

We find that the first winter after the alfalfa is sown it is more sensitive to winter pasturing than later on and under no conditions is it wise to pasture too closely with sheep. I think there are more fields of alfalfa spoiling in the Lethbridge district by the indiscriminate winter feeding of sheep than almost any other cause as they are apt to be on the ground when it is very wet and they dig up or disturb the ground to 2 or 3 inches down from the top and so injure the crown on the plant.

The longer we work with alfalfa and the longer we irrigate it, the more we hesitate about giving any dogmatic rules in regard to when and how it should be irrigated. Under some conditions fall irrigation is most desirable. Under other conditions and on certain soils it is not so desirable a method to follow. On certain soils we soon learn that it is not wise to irrigate late in the fall. Some seasons the land irrigated in the fall yields 50 per cent more the following season than that left unirrigated. On the other hand, if we happen to have an excessive amount of rainfall in the spring, fall irrigated stuff does not do so well and there is always the possibility of causing winter injury in certain locations. It is, therefore, most difficult to formulate dogmatic rules. It reminds me of the point our president made this morning. He made the statement that farming under irrigation tends to intensive

farming. That is true and as irrigated farming tends to more close attention to details generally, so it is with the growing of this forage crop so peculiarly adapted to irrigation, each farmer must work out his own details of management best suited to his particular farm.

There is just one rule that can be laid down and one can be quite safe in making it and that is whenever the land is dry and the alfalfa needs irrigation, it is pretty safe to give it. This will not only apply to summer irrigation, but also to fall irrigation, and one can safely irrigate in September. In October and November irrigation we are apt to encounter danger owing to the formation of ice on the surface.

It is not necessary in a meeting of this kind to point out that before alfalfa can be grown successfully we must determine that the field to be used has natural surface drainage. We must not have land where irrigation water will stand 24 or 48 hours after irrigating. It is practically impossible under those conditions to handle it right. This applies generally to the irrigation of all crops.

Prof. Bracken mentioned the advisability of sowing in June rather than July. The reason for that is that a better stand is obtained when sown during the rainy period. We find that seeding with a nurse crop does not give the most satisfactory results—the grain thins the stand down and although the fields look very nice to the casual observer, and look perhaps just as promising as the field next to it sown with a nurse crop, still the yield is not so great. We are seeding alfalfa down to last for a number of years and we must therefore seed, on irrigated land as on dry land, without a nurse if we wish to obtain maximum yields.

CHAIRMAN: You mean a robber crop?

Prof. FAIRFIELD: The president says he thinks I mean a robber crop, and I think he is right.

Prof. Bracken also said that five pounds of seed on well-prepared land gave the best results at Saskatoon. I may say that we have carried on a number of experiments at our Station and have observed the fields of a number of farmers in the district, and we have come to the conclusion that with land prepared in the ordinary way, it is not safe to sow much less than 12 or 15 pounds. Personally I like to sow up to 15 pounds on irrigated lands.

Perhaps what I have said and particularly what Prof. Bracken has said may provoke a discussion and in that discussion some interesting points may be brought up and discussed. (Applause.)

CHAIRMAN: If we have the farmer here who has been growing any of these samples I see here, it would be in order for him to say something. I understand Prof. Fairfield to say that in irrigating alfalfa you cannot flood it the same as the prairie land—you cannot leave it for 24 hours?

Prof. FAIRFIELD: Our system is flood irrigation. What I referred to was surface drainage. When the irrigation of a particular field is completed what water does not soak in must be made to drain off, otherwise it forms a slough, and if it remains on for a day or two in such a manner it turns the alfalfa yellow and injures it.

CHAIRMAN: In growing alfalfa on dry land, I was wondering whether Prof. Fairfield had any experience with sub-soiling for the retention of the moisture—that is before seeding down.

Prof. FAIRFIELD: We have carried on no experiments, but I can give my opinion. It would depend a great deal on the character of the subsoil. On seeding alfalfa on dry land I think it is exceedingly important to have it well summer-fallowed. If the land has been well summer-fallowed during a season and we have had a normal amount of rainfall the subsoil will be moist down to perhaps six or seven feet. My observation is that where moisture is present the alfalfa roots will go down through

practically any soil that I have had experience with, providing the moisture is there to lead it down. I do believe that it is very important to have the land ploughed at least six to eight inches deep. I question whether it would give enough increased yield on subsoiled land to pay for the additional cost.

Mr. JOHNSTONE: I have had no trouble in growing alfalfa but I have trouble in making hay. I have never bought any alfalfa that contained more than 25 per cent of the leaves. As a rule, when you buy alfalfa hay from here or any other place you find a bundle of sticks and it makes me believe that there are few that do know how to make proper hay. I think something should be done to make a demonstration of baling alfalfa hay.

DELEGATE: The feeding value of alfalfa is in the leaves. I have noticed the mangers in a barn about three-quarters full of alfalfa leaves, and it looked as if the horses would not eat the leaves and I spoke about it, and the owner said that it was a fact that the cattle would eat the leaves and leave the stalks and the horses would eat the stalks and leave the leaves. I have read in agricultural books also about turning cattle into alfalfa fields when the dew is on the grass, which would cause bloating in the cattle. If cattle eat part only of the alfalfa plant and the horses eat a part only and the cattle are liable to get bloated if they eat it when it is wet, we should, I think, hear more about rye or brome as it is the best pasture in the world.

CHAIRMAN: I do not think that any one wants to discriminate between the grasses and the clovers, but the theme at present is alfalfa. As to the fine part of the hay, I have found that all the finer parts of any hay will go to the bottom of the manger. I have been growing brome grass for over twenty years and I let it go to seed, and I use the hay for the horses and it makes particularly good horse hay, but there is a certain amount of chaff and you have to clean that out of the mangers, but the sheep and the cattle will eat that quite readily.

Mr. HUCKVALE: Mr. Fairfield was speaking about a certain amount of alfalfa killing out in the last winter or two and I think all those that are growing alfalfa have had the same experience in many years. I would like Prof. Fairfield to tell us what method he has for renovating those fields where alfalfa is killed out.

Prof. FAIRFIELD: I have never had success in reseeding an old alfalfa field. Where it thins down to the point where it is unprofitable to produce hay, we have found it better to plough it up and seed to grain and take off a crop or two and then reseed. Some years we have seeded and got a poor crop and then seeded it again next year. It is usually the old fields that kill down. Where we would ordinarily think that the plants had become well established, that is after a field is three or four years old, it is more apt to winter kill than when one or two years old. We have not had success in reseeding. We cannot get enough of the young plants going to thicken the stand up. I know of some instances where a field has gone to seed and the following year the seed that was shattered would come up and with careful irrigating and cutting the first crop early so as to let the sun on the young plants they have come through all right. But, under ordinary circumstances, it is well to plough up, and of course a person has a marvellous crop of grain or anything else they wish to grow following that.

Mr. W. PEARCE: I would like to ask Prof. Fairfield and Prof. Bracken if they have had any experience in siloing alfalfa?

Prof. BRACKEN: We have done a limited amount of alfalfa in the silo. We bumped up against what some one else has spoken of and that is curing alfalfa, and we have now demonstrated that alfalfa can be ensilaged satisfactorily, but it is rather liable to be laxative for animals. We do not recommend putting it in the silo alone from our experience, but it can be done, I think, with satisfactory results.

Mr. PEARCE: Three years ago I had the privilege of meeting the delegates from Kansas who attended the International Congress in Calgary, and they told me in regard to alfalfa growing under sub-irrigation that most of it was put in the silo, and they found that by putting the same quantity of straw as alfalfa through the cutter—that is the same quantity in bulk, not weight—the result was very much better than straight alfalfa. The straw in other words carried the properties that the alfalfa was weak in and they never thought of handling alfalfa in any other way. It was chiefly used in the production of beef and they used a certain amount of corn in the feeding, but the whole output of alfalfa was turned into meats. If you could get it into a silo, that would do away with the trouble of handling it. You could have the whole product in that way available. You would not have the horses picking out some and the cattle picking out the balance, and I do not know a better way of using our straw stacks than mixing it up.

Prof. LINFIELD: There are only one or two points that I might comment on. One is the fear of alfalfa killing out. Down with us we have got in the habit of rotating crops. As a matter of fact in the Gallatin Valley over there our crop rotation is two years in clover and two years in grain. If we grow three crops of grain on irrigation land it just cuts the grain crop in half. My advice to farmers down there is to plough up the alfalfa after four or five or six years and seed to grain. Of course, if you keep on growing it, it will grow. Go farther south and you will find it growing for many years in the one field. If you cultivate alfalfa in the fall or plough it in the fall it will kill it. It is hard to kill it by ploughing. It takes a lot of power. If our alfalfa does not kill out once in fifteen years I would rather have it killed out in half of that time. You have to have a soil crop intervening. If you are going to grow grain at all you should grow soil-enriching crops. The conditions in northern Montana are not so very much different to what you have here. I always figure where I am climatically, and when I climb 1,000 feet in the air I figure I am going 500 miles north and in the Gallatin Valley we really have a shorter season than you have here. In other words, you can grow things a hundred miles east of here that you cannot west of here. Your winter wheat is probably a case in point.

Speaking of climatic conditions, other things being equal, we have found it so and we get just as good returns by seeding to a grain crop. Our land is sometimes worth $200 to $300 an acre. We seed our alfalfa field to a grain crop and we have tried it out and afterwards we found we got just as much out of it. When land becomes high priced, as it is in the older settled districts, we cannot afford to have the land idle. That does not apply, of course, to dry land. I am speaking of irrigated land.

There is one other point that I would like to supplement and that is in the matter of alfalfa in the silo. It does not pay to silo it if you grow it as hay. I came to that conclusion a long time ago that it does not pay to ensilo any crops if you can cure it for hay. We have put alfalfa in the silo because it has been too wet at times to cure it. The stock has done very well feeding on it from the silo. If you can cure it for hay do so. With well cured hay or silo alfalfa there does not appear to be any difference for feed as the milk flow in dairy cattle seems to be kept up the same with either.

The CHAIRMAN: I will now call upon Mr. F. H. Peters, Commissioner of Irrigation, Department of the Interior. Calgary, for his address.

RESERVOIRS IN THE CYPRESS HILLS DISTRICT.

Mr. PETERS: I had the pleasure of giving an address on this same subject before the annual meeting of the Cypress Hills Water Users Association, I think two years ago. I am giving an address on the same subject again because I believe it is the most important question to be faced by the private irrigators in the future. Whenever

one studies the stream run-off of any of these streams in this district one main fact stands out clearly, namely, that in nearly every year about 75 per cent of the total annual flow runs off in March and April, which is long before the time that the water is most needed on the fields, or will do most good if applied. When we consider this and also note that periodically there are dry years with insufficient water, even if it were spread evenly over the season, and that periodically there are wet years with floods in the spring that do very great damage, we see immediately that there is only one cure for all these troubles, and that is reservoirs. The Cypress Hills water users are having the same experience as all other irrigation developers on streams on the prairie not fed by mountain snows. In fact it may be said of all streams that the greatest question concerning water supply is always reservoirs.

Water in a reservoir is like money in your pocket—you have it to spend when you want it; without a reservoir, water is like money some one has promised to pay you—you do not know when you will get it. The question here is fortunately not so much one of lack of quantity—there is enough water—it is just a question of reservoiring it, so that it is available during the dry, summer months when your fields need it. I want to make the point that at present most of the farmers who actually use water apply it on hay lands and one good soaking in the spring does a lot of good, but when the holdings are smaller, or when competition in future makes it necessary to work the land to its full capacity, you will want to have water for other crops in the later dry months. Further, reservoirs will store water and make it available for more land and thus benefit the whole district.

Before I start on facts and figures, you must realize that the building of reservoirs will be a big work, it will cost much money, but it is no bigger job now or in a few years than the building of the ditches was in the old days, when you were not so well established. Because it is a big job we must tackle it early so as to make haste slowly but surely. We must study the question from all angles, collect all data possible, get cost figures, etc., so that when the right time comes everything will be properly lined up.

You must also realize that this is a very complicated engineering question, to decide just how big the reservoirs should be, just how much water we can rely on saving, and so on. I do not present this paper as the final word in the matter, but rather have tried to put the matter before you in a general, but true light, anticipating that as time goes on our records will be more complete, and that when active agitation for the building of any reservoir takes place, it will be the proper time to make the final study of each case.

One other point—we have been getting suggestions from farmers as to possible sites so that we can study them as we are able. The Irrigation Branch still wants these suggestions if any one knows any more possible sites.

Reservoir No. 1—

Name.—Cypress Lake.

Township and range.—Township 6, range 26 and 27, west of 3rd meridian.

Total cost.—$481,570.10.

Capacity of reservoir.—126,625 acre-feet.

Cost per acre-foot.—$3.80.

Impounding dam on east side, located east half section 24, township 6, range 26, west 3rd meridian.

Impounding dam on west side, located section 15, township 6, range 27, west 3rd meridian.

Cypress Lase reservoir was completely surveyed in 1913 and all the necessary data for estimating capacity and cost is available. In the report of the Irrigation Branch published in 1914 the capacity and cost were figured for a dam 22 feet high at the east end. The figures taken out on this basis are as given in the foregoing schedule. The cost per acre-foot stored is very reasonable, $3.80, but when we reckon

on the cost per acre of land which can be irrigated and which land must pay for the reservoir, it runs into the higher figure of $16 per acre based on irrigating 31,000 acres.

At the present time we are able to estimate on the matter of water supply a little more closely because we now have more records available and the more recent survey of the Fifty Mile reservoir also affects the question.

In the irrigation report referred to above it was assumed in considering water supply that two or three wet years like 1912 might follow each other and that water would be stored for successive dry years like 1910 and 1914. This method of study led to the adoption of a reservoir capacity of 126,000 acre-feet, which is no doubt amply large and would give complete storage for all water available under any conditions which might arise. Making a more recent study of supply and demand based on stream flow records for 1911 to 1916, it is found that under these conditions a reservoir with a capacity of about 90,000 acre-feet would be large enough based on storing all the water available, absorption losses of 3 feet in the reservoir, and a gross duty at the reservoir of 1·5 acre-feet.

This study showed that the water supply available was sufficient to irrigate 21,531 acres only. The cost of the reservoir would, however, be reduced to about $340,000, making the cost per acre-foot stored about $3.77 and the cost per irrigable acre the same as before, about $16. This is just the same cost per irrigable acre as that originally figured, so that we may consider this price not far wrong.

The water in Cypress Lake reservoir under the latest study would be utilized to irrigate lands as follows: 5,231 acres on Battle creek below the reservoir for which rights are now granted or pending, and 2,000 acres of new land which it has been estimated lie below the reservoir and can be irrigated. On the Frenchman river 5,422 acres below the reservoir for which rights are now granted or pending, and 8,878 acres of new land which it has been estimated lie below the reservoir and can be irrigated. This makes up the total of 21,531 acres.

In connection with this reservoir, the only engineering point about which there is any question arises in connection with diverting the early spring run-off into the reservoir through the made canals. Those of you who were interested enough to read the report published in connection with the survey made will remember that it is planned to divert Battle creek, Belanger creek and Davis creek into the reservoir through made diversion canals. This spring run-off which produces practically all the water for storage takes place in March and April, and there may be very considerable difficulty in operating the diversion canals at this season of the year due to snow and ice conditions. Another point which should be noted is that in each year there is a certain quantity of water flowing into the streams below the reservoir which cannot be controlled. We have estimated that whatever quantity is available from this source will be used as it comes, in satisfying the water rights on all the irrigable land below the reservoir, up to the limit of getting 50 per cent of the required water in this way. In four out of the six years studied the irrigators would have had to take less than 20 per cent of their supply as it became uncontrolled, mostly in the early spring, and in two of the years they would have had to take 50 per cent, the remainder being figured as wasted. This feature is not very desirable, but was adopted so as to store and save as much water as possible for the driest years when it is most needed.

Reservoir No. 10—

Name.—Fifty Mile Reservoir.

Township and range.—Township 5, range 16, west 3rd meridian.

Total cost.—$355,800.

Capacity of reservoir.—Approximately 52,000 acre-feet.

Cost per acre-foot.—$6.84.

Impounding dam located.—NW. ¼ section 24 and NE. ¼ section 23, township 5, range 16, west 3rd meridian.

Height of dam.—55 feet.

To complete the storage problem for the Frenchman river we will take up the Fifty Mile reservoir. Surveys have been made of this site by the Irrigation Branch so that details as to capacity, cost and water supply are available. Studying this reservoir in the same manner as Cypress lake we have adopted a dam height of 55 feet, giving a reservoir capacity of 52,000 acre-feet. This works out at $6·84 per acre-foot stored and nearly $21 per acre of irrigable land to be served. This is based on serving an irrigable area of 17,000 acres. It has been estimated that there are 24,000 new acres which can be irrigated on the Frenchman all below this reservoir. The 8,000 odd new acres estimated to be served from Cypress lake also lie below the Fifty Mile reservoir, so together our study provides water for a little more than the estimated acreage. The water for the 8,000 odd acres is to be held in the Cypress Lake reservoir, because it is cheaper to provide the storage there than in the Fifty Mile.

To sum up then for Battle creek and Frenchman river, we are dealing with a total irrigable area of 45,708 acres. On Battle creek, water can be stored for 5,231 acres now developed and 2,000 new acres for $16 per acre. There are still 3,475 acres above the reservoir and 185 acres on tributaries below, which cannot benefit directly by the reservoir. On Frenchman river there are 5,422 acres now developed and 8,878 new acres for which water can be stored at $16. There are an additional 15,122 new acres which can be served by reservoir water at $21 per acre. There are still 2,494 acres above the reservoirs and 2,901 acres on tributaries below, which cannot be directly benefited. That is 80 per cent of the irrigable land can be provided with reservoir water and 20 per cent cannot be so provided. While the irrigable acres above the reservoirs and on the tributaries could not benefit directly by the reservoirs they probably could do so indirectly by paying a certain percentage of the cost of the reservoir and thus buying all the low water flow which could be used by them in lieu of flood waters stored and which could be equally well used by the irrigators below the reservoirs.

Reservoir No. 2—

Name.—Middle Creek.

Township and range.—Township 5, range 30, west 3rd meridian, and range 1, west 4th meridian.

Total cost.—$66,458.

Capacity of reservoir.—21,826 acre-feet.

Cost per acre-foot.—$3.04.

Impounding dam located.—NE. ¼ section 21, township 5, range 30, west 3rd meridian.

This reservoir was also completely surveyed in 1913 and all the necessary data for estimating the capacity and cost is available. While it is feasible to divert water from Middle creek into Battle creek and thence into Cypress Lake reservoir there would be no object in this since the reservoir site on Middle creek is large enough to store all the water available and control it for use below on the same creek.

The most recent study of supply and demand conditions for this reservoir based on the actual stream records for 1911 to 1916 adopts a reservoir capacity of 15,000 acre-feet as the most desirable and which is sufficient to control the total supply available which occurred during these years.

The cost of this reservoir is estimated at $66,458, making the cost per acre-foot stored, $4.43. The total area which could be served is 3,130 acres, which comprises 1,530 acres now developed and 1,600 new acres out of the area which it has been estimated can be irrigated and lie below the reservoir. Based on 3,130 irrigable acres the cost of this development is $21.23 per acre. Considering the whole of Middle creek, there is an additional irrigable area of 1,271 acres lying above the reservoir and 97 acres on tributaries below, which cannot be served from the reservoir. In addition to this 792 acres of irrigable land will be flooded out by the reservoir.

It is to be noted again that in the study made as above, all the additional uncontrolled flow in the creek below the reservoir is assumed to be utilized, as it occurs naturally and mostly in the early spring. The percentage of the total supply which would have had to be used in this way in the study made would average 68 per cent.

There are no difficult engineering features in connection with this reservoir, but viewed from an economic standpoint there are two bad features in the high absorption losses from such a shallow reservoir and the fact that so much irrigable land has to be flooded, its productive value is therefore permanently ruined.

We estimate absorption losses of at least 3 acre-feet per acre of water surface in the reservoir. The duty on the land is estimated at 1·5 acre-feet, so that for every acre of water surface in the reservoir we lose enough water to irrigate 2 acres of land below. The water surface in this reservoir would be about 1,000 acres, so that in order to save water enough to irrigate the 3,000 odd acres below we are forced into losing water enough to irrigate 2,000 acres. There is no way of overcoming this loss if we try to store water over from year to year, which it is necessary to do in order to provide the maximum conservation of water.

Then again in order to benefit 3,130 irrigable acres below we have to destroy 792 irrigable acres in the reservoir site. That is to say that for every 4 acres benefited we have to destroy 1 acre. If we adopt the viewpoint that we have plenty of land out here in the West, there seems to be no objection to this, but when we consider that the whole proposition is one for the reclamation of, and added productivity to, certain lands for the benefit of not only the few people owning the lands improved, but for the benefit of the whole community, it is difficult to justify the destruction of such a high ratio of equally good land in the reservoir.

Reservoir No. 4—

Name.—Maple Creek.
Township and range.—Township 10, range 26, west 3rd meridian.
Total cost.—$24,667.
Capacity of reservoir.—1,954 acre-feet.
Cost per acre-foot.—$12.62.
Impounding dam located.—SW. ¼ section 17 and SE. ¼ section 18, township 10, range 26, west 3rd meridian.

Reservoir No. 5—

Name.—Parsons Lake, Maple Creek.
Township and range.—Township 10, ranges 25 and 26, west 3rd meridian.
Total cost.—$7,000.
Capacity of reservoir.—418 acre-feet.
Cost per acre-foot.—$16.70.
Impounding dam located.—SE. ¼ section 13, township 10, range 26, west 3rd meridian.

Reservoir No. 8—

Name.—Downie Lake Reservoir, Gap Creek.
Township and range.—Township 10, range 28, west 3rd meridian.
Total cost.—$6,600.
Capacity of reservoir.—4,200 acre-feet.
Cost per acre-foot.—$1.60.

Reservoir No. 9—

Name.—At junction of Gap and Maple Creeks.
Township and range.—Township 11, range 26.
Total cost.—$35,000.
Capacity of reservoir.—Approximately 3,200 acre-feet.
Cost per acre-foot.—$11.

We will now consider Maple Creek watershed on which we have investigated the four reservoir sites noted above. The first two reservoirs have small capacities of 1,954 acre-feet and 418 acre-feet. Their cost of development would be rather high also, $12.62 and $16.70, respectively, per acre-foot stored, so that probably they will not be developed until after the latter two which appear to be more favourable sites.

Downie Lake reservoir is the cheapest of any that we have investigated in the Cypress hills, having an available capacity of 4,200 acre-feet, at an estimated cost of $1.50 per acre-foot stored.

We have no direct stream records of the supply available for this reservoir, but our estimations, based on records for 1911 to 1916 indicate that the reservoir could be fully filled in three years and only about half filled the other three, so that there probably is not the water available to store over from one year to another.

Maple Creek reservoir No. 9 was surveyed recently and the cost taken out for a reservoir capacity of 3,200 acre-feet. This capacity would not be nearly great enough to store all the water that is available from Maple and Gap creeks, and a further tentative study has been made, based on raising the dam 5 feet, which would increase the capacity to about 6,230 acre-feet and the cost to about $57,640, or $9.25 per acre-foot stored. In either case the reservoir is not big enough to store all the water available and it would not be large enough to store water over from year to year.

Considering Downie reservoir and No. 9 together, there are 5,086 irrigable acres now developed below them. On the basis of using these reservoirs to store the spring freshets for use later on the same year only, and figuring absorption losses for two or three months, each year we might by using the larger capacity for No. 9 have available there about 5,400 acre-feet and in Downie about 2,000 acre-feet. This total of 7,400 would store enough to provide practically a full duty of 1·5 acre-feet for the irrigable land between and assessing the total cost of $64,240 against 5,158 acres would amount to $12.45 per acre.

Discussing the watershed again in a general way, we have four reservoirs, with a maximum capacity of 12,802 acre-feet, assuming that the three upper ones could always be filled. The stream records of the total flow occurring above the lowest reservoir for 1911-1916 show an average water supply of 20,266 acre-feet varying from 8,660 acre-feet to 34,745 acre-feet in dry and wet years. Lying below the four reservoirs there are 5,378 acres of irrigable land and above them 1,178 acres.

The development of the reservoirs as indicated above would give an assured and fully controlled supply to all the irrigable land now developed. It would also allow of new irrigable land utilizing the surplus spring flow during the wet years, say four out of every six, but the new irrigable land would have no assurance of supply during the other two years if we accept the run-off for 1911-1916 as typical.

Reservoir No. 3—

Name.—Skull Creek.

Township and range.—Township 11, range 22, west 3rd meridian.

Total cost.—$28,390.

Capacity of reservoir.—3,873 acre-feet.

Cost per acre-foot.—$7.35.

Impounding dam located.—SE. ¼ section 9, township 11, range 22, west 3rd meridian.

The stream records on Skull creek for 1909-1916 show an average run-off available of about 2,800 acre-feet, varying from 800 to 7,000 acre-feet in dry and wet years. The maximum capacity of the reservoir is 3,873 acre-feet and the annual requirements based on a duty of 1·5 acre-feet amount to 1,854 acre-feet, so that without having made any detail study it appears that this reservoir is not large enough to carry over from year to year and always provide nearly a full supply, because of the loss by absorption. There are 1,236 irrigable acres on Skull creek of which 1,070 acres lie

below the reservoir. If the maximum capacity was developed at a cost of $28,390 and assessed against the acreage below it would amount to $26.50 per acre.

It would seem that in this case the best scheme would be to develop the reservoir to a capacity sufficient to store the spring floods and use the water later on in the same year only. A rough study indicates that for this purpose a capacity of 2,600 acre-feet would be sufficient, reducing the cost to about $24,000, which assessed against the acreage below, would amount to $22.43 per acre.

Reservoir No. 6—

Name.—Hay Creek.
Township and range.—Township 10, range 25, west 3rd meridian.
Total cost.—$2,544.50.
Capacity of reservoir.—294 acre-feet.
Cost per acre-foot.—$8.64.
Impounding dam located.—NE. ¼ section 8, township 10, range 25, west 3rd meridian.

Reservoir No. 7.

Name.—Hammonds Lake, Hay Creek.
Township and range.—Township 10, range 25, west 3rd meridian.
Total cost.—$4,035.
Capacity of reservoir.—333 acre-feet.
Cost per acre.—$12.12.
Impounding dam located.—SE. ¼ section 9, township 10, range 25, west 3rd meridian.

On Hay creek there has been some investigation made of reservoirs Nos. 6 and 7. The first has a maximum capacity of 294 acres, which can be developed at a cost of $8.64 per acre-foot stored. The second has a maximum capacity of 333 acre-feet, at $12.12 per acre-foot stored. The total irrigable area developed below these two reservoirs is 1,330 acres, so that at best they could only store a part supply and the cost would be high.

If I have suggested at any place in my paper that the cost will run rather high or that the reservoir sites are not particularly good ones, I want no one to construe this in the light that I am trying to pour cold water on any of the developments. I have simply studied each case in the light of the best information available and, using my best judgment, have tried to place the facts before you in their true light.

In conclusion, gentlemen, I can only say what I did in the commencement, that this question of reservoir development is a most important one and deserves the most full and continued attention until the ways and means are found to develop every possible reservoir to its fullest capacity of usefulness. (Applause.)

CHAIRMAN: I presume this is really a reclamation scheme outlined and to be used at such time as the farmers desire to have allocations made to them. The cost of $16 per acre seems to be high, but when you count the difference between a crop of 1915 and a crop of this year, the cost will go a long way to pay for the difference. It is really not much greater than clearing heavy scrub land. So it is not so much out of the way as it seems, but the question is how soon will the settlement require this class of land. There is no doubt in my mind that when we come to have the population and development we will have such conditions as will warrant it. The next on our programme is an address from Prof. E. E. Prince, Dominion Commissioner of Fisheries. In his absence, Mr. S. G. Porter, of the Department of the Interior, will read the paper.

INSTALLING FISH IN RESERVOIRS.

By Professor Edward E. Prince, Dominion Commissioner of Fisheries, Ottawa.

It has been asserted again and again that it is impossible to carry on any fishing with irrigation and maintain a supply of fish in the same areas. It is because I hold the opposite opinion that I venture to present a paper on the subject to-day. But while I believe that a supply of useful fish, useful for the table and for sport, can be maintained and indeed made a part of a system of land irrigation, it is essential in my view that effective means should be taken to prevent the destruction of fish inhabiting irrigation canals. The Venerable Doctor John A. Henshall, the well known Montana fishery expert, wrote in 1903: "It is disheartening and discouraging to the western fish culturist to know that millions of fish, both large and small, annually perish through being stranded on meadows and grain fields as a result of unscreened ditches." He sees a large percentage of the work of the United States Fish Commission go for naught from this cause. There is, of course, much diversity of opinion as to the importance of fish as compared with the interests of agriculture and many agree with the naval authority who stated to the Dominion Fishery Commission in 1910, "that you can't have irrigation and fish." Now the screening of irrigation ditches in general is not difficult, though it must always involve some trouble and expense, or the fish, especially the schools of young fish, will pass out of the "laterals"; but there are cases, particularly the large reservoirs and canals, when the difficulty is great. Thus it must be admitted that the maintenance of screens on canals of such large capacity as the Bow River reservoir, supplied from the Bow river, presents a serious difficulty. The gates are four feet wide with ten feet head of water from the river, and over 1,500 miles of ditches can be supplied under this Canadian Pacific irrigation scheme. The Dominion Fishery Commission, 1910, already referred to, after looking into this matter, admitted that there was difficulty owing to the water being more or less charged at certain times with floating matter such as leaves, weeds, etc., but, added the commissioners, the difficulty can in most cases be overcome by erecting screens, not at the intake, where there is a great force of water, but lower down in the canal at a point below the first water gate. If screens placed in such a position show a tendency to become blocked with debris it would be necessary to have men visit them and keep them clear, in the opinion of the commissioners.

It seems to me that this subject of fish and irrigation divides itself into two sections. In the first place we have irrigation systems in the hilly country amongst the foothills, the supply of water being obtained from swift mountain streams. The character of the water and kinds of fish differ most markedly from those of the lower country and the plains, where the water is more sluggish, and the conditions are adapted for fish of wholly different kinds. The foothill streams are inhabited with the best kind of fish, fish not only esteemed by the sportsman but regarded also as superior table fish. These superior kinds are the gamy red-throat or cut-throat trout, the esteemed grayling, that is, the true grayling with the high dorsal fin, and the Rocky mountain whitefish, also known as Williamson's whitefish, which is commonly called grayling in the Calgary district. Now I do not hesitate to say that screens should be provided at the intake of these smaller irrigation canals to prevent the entrance of these justly esteemed kinds of fish. The difficulty is not great, as the water is very free from floating debris, and little labour would be required to clear away any small accumulation of weeds or leaves. It is very difficult in the case of the very large canals or reservoirs, these being of great capacity, usually of considerable width and depth, and the body of water very large at the intake, so that the matter from a fisheries point of view is wholly unlike that which the smaller irrigation systems present. Such reservoirs of great capacity in which a large body of water moves slowly could, in my opinion, be turned to excellent account for fish culture. It is true that the Alberta Commission, on page 13 of part 2 of their report, before referred to, stated that certain inferior kinds of fish might be positively

increased in numbers, after the erection of dams and the retention of bodies of water to supply irrigation canals. In speaking of the Southern Alberta irrigation scheme they said, respecting the ten foot dam southwest of Namaka, "If fish, mostly pike (or jack-fish) or suckers found their way into the reservoir, below the head gates, a larger number of these fish would thrive there than occur in the Bow river and fish food for the people would be increased," and they pointed out also that the Canadian Pacific Railway reservoir near Bassano, three miles below the headgates would be a benefit rather than a detriment to fish, if proper precautions were adopted.

The erection of dams, and the blocking of even important streams is not always a detriment, for the retention of a large body of water may provide more food, cooler conditions, and more ample environment for fish, and result in larger fish and a more abundant supply. Local conditions vary, and a condition that may be injurious in one locality may be actually beneficial in another. I can recall two cases of substantial benefit to the fisheries, due to the erection of dams which caused great complaint and local criticism on the part of mistaken enthusiasts. Thus, in a trout stream in Guysborough County, Nova Scotia, small trout abounded, though at certain seasons some large sea trout ascended and later descended and returned to the sea; but after the erection of a dam for logging purposes, the body of water above was increased, and the trout retained in this deeper water increased in quantity and became of much larger average size, so that the anglers who complained of the dam at first, readily admitted the substantial benefit to fishing which had resulted. In the Grand river in Ontario a dam was erected near Dunnville. Owing to complaints that fish could not migrate up the river, and that the dam obstructed ascending schools, a fishway was erected; but proved wholly useless. Fish, however, above the dam began to increase, and angling greatly improved, for such fish as black bass and pickerel and pike perch spawned, and the schools of young were retained and could not leave the river, hence the fishing was in every way benefited. The local anglers appreciated the situation, and adopted a system of netting bass and other fish below the dam and transferring them to the deeper waters above, where they permanently remained. Now, the canals and reservoirs which form so important a part of all schemes of irrigation provide the very conditions for similar fish culture work. As a rule the lakes and streams in northern areas, where irrigation systems are being carried out, are shallow, often not very pure, frequently effected by saline and alkaline elements, reduced or dried up in summer, and frozen to the bottom in winter, and thus afford every condition unfavourable for fish. A wholly new condition is created by the construction of canals and reservoirs under irrigation schemes. Large bodies of water, deep, cool, and free from excessive impurities are created, and a great opportunity arises, therefore, for turning them to account as fish-producing constructions. Irrigation canals might become angling reserves, or, if of large dimensions, sources of fish food for the communities in which they are located.

What then are the possibilities of securing fish production in such larger reservoirs or canals? Insect food usually establishes itself in a very short time, often in a few months after water is admitted; various fresh-water mollusks, water snails, etc., are carried by birds, and rapidly become numerous. But the food conditions necessary for fish could be hastened by the transference of such aquatic life from other waters. Species of small minnows (always excluding the destructive and harmful sticklebacks, small fish with three or more sharp spines on their back) will require to be introduced in most cases, as there are few large kinds of fish which do not prey upon these small species or feed upon their spawn and diminutive fry. But the question of food for fishes need cause no concern as both minnows and insect food and water snails will rapidly increase soon after they are introduced. It must, I fear, be taken for granted that the finest game fish, such as the various western trouts and graylings, are not suitable. They must have rippling, rapid water, gravelly shallows, and the conditions generally which are characteristic of mountain streams. The eggs of such fishes also are deposited, and the young fish hatch out on sandy or

gravelly areas, where the water is swift and sunlight finds access to hasten incubation. There are, however, many species of fish whose eggs are tenacious and glutinous, which develop successfully in comparatively still water. Much is to be said in favour of the yellow perch, an active, handsome fish, which affords considerable sport, especially large, strong specimens, and which deposits ribbon-like masses of sticky eggs in spring. These eggs cling to submerged beams, gate posts, water plants, etc., where the sunlight has access, and the young fry hatch out in a week or ten days. The perch, in my opinion, is a sweet and acceptable table fish, the best of "pan-fishes," one American writer declares, though the bones are numerous as is the case with most fresh-water fish, apart from the trout family. While the yellow perch is not highly esteemed by Canadian anglers, it has long been valued by European sportsmen, and is praised by many authorities in the United States, and on one occasion while fly fishing for black bass in the upper Ottawa waters a large two-pound perch took my fly and was so strong and fought so fiercely that for a little while I imagined that a good bass was at the end of my line. As the fish failed to break water and did not savagely wriggle to free himself from the hook, though he made strong and powerful rushes, I soon realized that the fish was not a bass. The yellow perch, in other words, is a good game fish, and as it breeds under such conditions as I have specified, is very prolific and rapidly hatches out, it is apt to over-run waters in which it is established and provided with proper food conditions. A fish so hardy and so prolific—possessing good game qualities and excellent on the table—is an ideal species for irrigation reservoirs, and is certain to so increase as to cause no disappointment. Of the jackfish and suckers I need say nothing. They have tenacious spawn which adheres on any surface under water with which it comes in contact. They are really not game fish, nor are they first-class table fish, although the western pike or jackfish is a firmer, sweeter fish than the eastern pike. All fish, of course, have some value, and the inferior kinds are better than no fish at all; but the jackfish is a fresh-water shark and should not be encouraged. Most of us, at any rate Canadians, do not value highly any of the catfish family. Their slimy, smooth bodies, grovelling habits, and numerous projecting whiskers or feelers render them very unattractive; but they are really fine food-fish, and most excellent if properly served upon the table. Some angling authorities even include them amongst sporting fish. There is one species which in most respects is superior to the rest, viz., the large channel catfish. The channel catfish is found in the Great Lakes and the connecting rivers and is one of the best of table fish, while its voracity and strong and powerful motions when hooked entitle it to consideration. Its eggs are gummy and cling to any object under water, though it is said to construct a rude nest of stones and to guard the eggs and fry. My own opinion is that it does not always do this, though many of its smaller congeners are nest builders and most assiduous guardians of the eggs and young.

Of the black bass I need not say much because their introduction in irrigation reservoirs might cause disappointment. They are inordinately voracious, and not only clean out other species, but devour each other. Hence few bass can be maintained where a far greater number of yellow perch, or other species, would live and flourish. The bass build nests in comparatively shallow water, 3 to 6 feet deep. It would be necessary to construct long shelves or platforms of concrete or of wood covered with gravel, in order to create shallow nesting areas. Even the yellow perch would increase more favourably were such platforms provided, sloping from 3 feet to 6 or 8 feet, in order to avoid risk of freezing when the eggs are first deposited in May or even April. Wall-eyed pike, or pike perch, are fine fish, but they must have shallow gravel spawning areas, and running water is really a necessity to produce the best results.

There is, therefore, quite a future for the fish possibilities of irrigation canals; but it is necessary to guard against the destruction of the schools of young by devices to prevent their reaching the system of ditches and "laterals" whereby they may be stranded on the land. Wire screens of various designs have been tried. These are

essential at the intake or inlet of all ditches or canals, supplied from mountain streams or rivers abounding in trout or superior fish. A fishery officer testified before the Alberta Commission, 1910, page 95, part 2 of their report, that "irrigation ditches are a great cause of destruction. . . . . the screening of irrigation ditches is possible if properly done." One experienced witness said the harm done was small. He said (page 96): "I have had much experience with ditches, especially from the Elbow river. Pike and bull trout come down, but only one or two cut-throat trout."

Another witness said, "the streams are being depleted too fast; but I don't think irrigation ditches have done the harm. I never saw trout in irrigation ditches or trapped in pools overflowed. I have seen suckers and grayling; but trout are too smart, and are never taken in irrigation ditches." No doubt the harm to fishes alleged to be due to irrigation ditches has been exaggerated; but it is best to guard against risks and I agree with an old rancher in the foothills, near High River, who said: "At the head gates there should be screens. They would not clog as there is not enough rubbish to cause much bother."

On the prairie proper, as I have said, the object of screens would be to prevent the fry from wandering out of the main canals or reservoirs into the smaller ditches, and revolving screens have been tried with success.

Dr. Henshall's device is the simplest. It consists of a short flume at the head of the ditch, with enough fall to operate an eight-bladed paddle wheel, fitting the flume closely. In a wide ditch, and correspondingly wide flume, two wheels would be best. The bearings of the shaft work in a vertical slot so that any hard substance can pass under by raising one wheel. The splashing of the paddles frighten the fish and they make no attempt to descend. A revolving cylinder or drum of wire can be added, working in the opposite direction outside the paddles and actuated by pulleys from a shaft, the belt being crossed so that wheel and screen revolve in opposite directions. A device similar to Dr. Henshall's was invented by Mr. W. Parsons, Fort Bidwell, California. It is United States patent 1166628 and the water wheel and wire drum revolve in opposite directions, but it has gear for carrying driftwood and rubbish over the screen. Mr. Julius Dreher, Detroit, has a simple paddle device in a flume with prongs as well as paddles to stop fish. It is United States No. 1150348. The most elaborate revolving screen is that patented by Mr. H. Broberg, Warmsprings, Montana, United States patent No. 1147301 (1914), which rotates on a vertical, not a horizontal, shaft, and ingeniously devised to keep fish from passing through, while preventing clogging by rubbish.

If simple screen devices were installed at the inlet of irrigation ditches I see every ground for regarding the larger canals and reservoirs as offering great possibilities as fish reserves, where suitable species would find location for spawning and hatching out the young fry by retaining the schools of fry season after season, and preventing their escape into ditches and laterals supplied with water from the reservoir. Facilities for sport would be ensured, and local needs in the way of fish for the table provided within certain limits.

Any scheme for converting irrigation canals and reservoirs into such fish reserves in the western provinces would have my hearty support, and would in my opinion be entitled to every aid from the Fish Culture Branch of the Dominion Fisheries Department.

CHAIRMAN: The last two papers remind us very much that little has as yet been done in the way of developing Canadian resources. I now call upon Mr. F. H. Auld, Deputy Minister of Agriculture, Regina.

Mr. AULD: Those of you who have followed the successive conventions of this association will have noted the very original and effective designs which have been issued from time to time announcing the various meetings. I have in mind one that

was issued in connection with the Lethbridge convention four years ago. It was a picture showing a bridal party and underneath was the legend, "The Union of Sunshine and Rain." That brings to my mind a thought in connection with this province of Saskatchewan. Saskatchewan has been charged with being lukewarm towards irrigation, but we have not been inattentive, as some of you know. We may have watched Miss Irrigation from afar off, but we have had a certain disguised regard for her and have endeavoured to make a closer acquaintance. Last year at Kamloops there was a good representation from this province and district. You know the old story of Miles Standish's courtship when he was too busy, irrigating alfalfa, I suppose, and sent somebody else to "speak for him," with disastrous consequences. But last year we had a gentleman whom you all know well speak to Miss Irrigation on behalf of this province and while she did not declare herself too readily, yet Mr. Williamson spoke so effectively on our behalf that Miss Irrigation came to visit us, and we are very glad to have you here to-day.

The question of irrigation is really not very much to the fore in this province at present, and it is therefore very appropriate that this convention should be held in this town of Maple Creek as it is in this district and in the Cypress hills that irrigation development in Saskatchewan has taken place. The Cypress Hills district is practically the limit of the irrigation development in Saskatchewan. The Cypress hills, as you know, is an old ranching country. The hills are probably 75 miles long with a less distance from north to south, and extend past the boundary line into Alberta. They also contain the highest point in this province, which is about 4,250 feet above sea-level. In the Cypress hills we have old Fort Walsh, which I believe was the original headquarters of the Mounted Police in the days when the Indians and the whisky traders were worth watching. Irrigation work in the Cypress hills consists of probably 275 to 300 individual projects. In comparison with the big irrigation enterprises in Alberta and British Columbia, these individual projects may look small or unimportant, but we are beginning to see that nothing is too small for production in these days and that serious consequences may hinge on small things, and these small irrigation projects are deserving of more consideration than they have received in the past. The irrigable area amounts to approximately 100,000 acres.

I was impressed by an article which I read recently on agriculture in Denmark. That little country, with only a little more than 15,000 square miles, is very small indeed in comparison with Saskatchewan, which has an area of a quarter of a million square miles. The area of Denmark might be compared with that portion of Saskatchewan from Swift Current west to Alberta and from the Saskatchewan river to the international boundary. That section is just about the size of Denmark, but in Denmark they have over 1,500 creameries. They have 64 pork packing plants, which handle annually about 2,000,000 hogs, valued at about $30,000,000. They have 500 egg-gathering centres. That is an example of intensified agriculture. It is true that their labour conditions are not comparable to ours, and market and soil and climatic conditions are different from ours, but if irrigation means anything it means intensified agriculture, and when we get our irrigation work going as we should, we may look for results in the direction of more intensive methods.

But in the Cypress Hills regions we have not yet made the progress we are hoping to make in irrigation for the reason, as Mr. Peters pointed out, that reservoirs are necessary in order that we may have the water when water can best be employed. Perhaps these reservoirs would be more readily obtained if we had legislation enabling several irrigators to take joint action. We have no legislation in this province regarding irrigation districts such as is in force in Alberta, but we have legislation in regard to drainage districts which embodies the same principle and I venture to suggest that if the getting of legislation regarding irrigation districts is going to aid in the solution of that question, our president and his colleagues of the Saskatchewan Government might be asked that legislation be passed to permit individuals

to get together and develop necessary storage systems. We have in Saskatchewan a local government board which has to approve the sale of securities of this nature, and I believe that the approval of their securities by the Board would assist our irrigators in financing the cost of irrigation reservoirs.

While we believe that there is a great future for irrigation in this district it may not be amiss to recognize the progress in other lines of agriculture which has already taken place. We had more than one hundred thousand farmers at the time of the last census, and their annual revenue is now between a third and a half billion dollars. Grain is of course the main source of revenue, but live stock and live stock products constitute an ever increasing percentage. For the reason that we have made some progress in improving marketing methods I propose to make a brief reference to what has been done to realize maximum returns to the producers without adding to the burdens of the consumer.

The facts are so well known regarding the system which has been built up for the marketing of our grain that extended reference to it is unnecessary. The big line of Saskatchewan Co-operative country elevators is now being given a terminal outlet which should be of great value.

Older, however, than the farmers co-operative elevators are the co-operative creameries, of which our Assistant Dairy Commissioner will speak to-night. The several locals are now merged into one large, strong co-operative concern and this company should have a bright future. The number of creameries and their output have largely increased since 1907.

Another line of effort which has proven quite popular is the co-operative marketing of live stock by live stock shipping associations. The Co-operative Organization Branch of our department promotes this work and supplies an experienced man to assist associations in handling their first consignments. Not all of the associations, nor even a majority of them are shipping their stock co-operatively, but those which are doing it are enlarging their business and this is bound to increase, as the principle is absolutely sound.

Our co-operative branch also acts as a marketing agent for wool and poultry, and as a medium for the exchange of information for those who have articles for sale or are in the market to buy. Wool marketing was taken up four years ago and the department was able, by economical handling and the concentration of wool in one lot to get better prices than had previously been obtained. Each year has shown an increase in quantity as well as in price, and a marked improvement has been effected over old methods when the local merchant received the wool in trade and shipped to his grocery jobber who supplied the wool jobber who sold to another speculator or to the manufacturer. To-day, the number of middlemen has been lessened to the benefit of the producer who sold his wool locally as well as to the man who used the services of the department.

The same remark applies to the co-operative poultry marketing work of the department, which has been carried on for two seasons. The result of this has been the standardizing of prices and a larger net return for poultrymen.

In the dairy work as well as the poultry and wool marketing work the same principle prevailed. The government official assumed full charge of the work, paid the patrons an advance and the balance as soon as the product was sold.

These few illustrations of what may be accomplished all tend towards more intensified agriculture and hasten the day when larger production will be in evidence and aid the introduction of co-operative marketing of our products. The live stock industry in this province is receiving the special attention of a commission appointed by the province of Saskatchewan to investigate conditions and make suggestions as to what improvement is necessary in marketing of live stock and live stock products. The inquiry is still going on.

It is a little disappointing at this season to realize that we are not going to have as bountiful a crop as we hoped to have a few weeks ago. We need it for national reasons

and we need it ourselves for economic reasons. We are, however, by present indications going to get just as much money for our grain as we got last year, and we got as much last year as we did in 1915. Many farmers, however, will have bumper crops if present promises are realized. There is, however, a fact that is not so comforting and that is the production of coarse grains in Western Saskatchewan this year is very low. The oat crop in some districts is practically a failure and the effect that is going to have on the live stock industry is detrimental.

There is, however, in all this a good feature, and it is that, apart altogether from the larger attention which may be given to irrigation and the greater impetus which that branch of farming may receive, there has been a great stimulus to the better application of dry farming methods. Down through this district which has been settled by grain growers for only a few years, and taking the whole country east of here as far as the Soo line, there has been great improvements in farming methods, and whereas in 1914 there was a total and complete failure in many districts in the southwest, there is to-day practically no district that cannot show good summer fallow fields of wheat which indicates that there is now such a mastery of conditions as will make it possible to have good agricultural results irrespective of dry seasons.

A disappointing feature of the crop situation to which I referred is the short crop of coarse grains in certain districts in the western part of the province. I am hopeful that it will not be necessary to sacrifice unfinished hogs and cattle as was done in 1914, and I think that breeding stock can be carried over with a careful husbanding of our fodder supply. Any adverse effect on our live stock industry is greatly to be regretted at this juncture. We have for several years past been laying the foundation of a provincial live stock industry by buying up suitable breeding stock of both cattle and sheep and supplying farmers without the necessary cash to pay in full for their purchases, selling with a small cash payment and accepting notes payable in one to two years with interest at 6 per cent per annum. This work was carried on under the provisions of our Live Stock Purchase and Sale Act and has been instrumental in starting a great many new herds of cattle and sheep. A part of the policy is the distribution of good pure-bred bulls, boars and rams. This year we are prepared to spend a quarter of a million dollars for the purchase of live stock for sale on credit terms. In this work we endeavour to supply stock at cost. This of course includes the cost of purchasing the animals as well as the purchase price of the animals supplied.

Our duty these days, however, is not limited to production. A very important phase has to do with conservation. Dr. J. W. Robertson told the people in Ottawa a short time ago that it was estimated that five million people will starve to death in Europe during the next twelve months. I presume that a great deal of suffering will occur in the war-devastated areas, especially among the older people and young children, but the efforts at food conservation which are being made in Great Britain and in the countries with which we are allied emphasizes the importance attached to food conservation. In fact we have a Food Controller in Canada. The problem here, however, is different from that of the British Food Controller. We must conserve in order that our exportable surplus may be increased. They must conserve lest their production and importations of foodstuffs combined should be insufficient. I do not know what methods will be adopted in order to aid the Food Controller in the conservation of foodstuffs, but it is my opinion that all the public needs in order to bring about the greatest possible saving of our food supply is to know the facts. Any effort or sacrifice that is needed will be made. I cannot, however, believe that our western people are extravagant in their food requirements. We may have been and probably were extravagant in the boom days a few years ago, but the high cost of foodstuffs to-day is having a wonderful tonic effect in so far as conservation is concerned.

One who reflects on this question can not but realize the importance that is attached to production, and production to-day in Western Canada depends on more

man power in order to cultivate more acres and to cultivate better the acres which are now being farmed. Judging from the reports which we are getting from the East it would appear that there is hardly a province of Canada which has a surplus of farm labour and the outlook for the handling of our grain crop is serious. Some solution of our labour problem must be had if production is to be carried to the point which appears to be so vitally necessary, but whatever we do in this direction must be characterized by thoroughness and careful work. "Better farming" and "better business methods in farming" must be the slogan, so that the utmost may be realized for the labour which is put into our farm operations. If we get that not only will we assist in the present crisis, but we will assist in building up better institutions and better living conditions in these broad prairies and in the fertile valleys of our sister province of British Columbia. (Applause.)

CHAIRMAN: The information which Mr. Auld has given to us as to the conditions in Europe is most astounding and is indeed a very serious affair and shows the need for more attention to our agricultural work.

With reference to Mr. Peter's address. At the last convention of the Cypress Hills Water Users' Association I made a resolution, which, unlike the average New Year's resolution, was carried out, and that was to make a trip to the Cypress hills. I find myself intensely interested in those individual projects in that district and I feel that I should make myself more familiar with them. We have drainage propositions which are practically identical in principle so far as the cost and allocation is concerned and I will give this convention my assurance to see whether the time has come that we should have similar legislation in this province as they have in our sister provinces with regard to the individual irrigation projects. (Applause).

We will now adjourn to meet again at eight o'clock this evening and I would ask you to be here promptly in order that we can keep to our programme.

EVENING SESSION—WEDNESDAY, AUGUST 1.

CHAIRMAN: The first speaker of the evening is Premier Martin, whom I have much pleasure in introducing.

Premier MARTIN: I am very glad to be here, and as a member of the Government to welcome the delegates not only from Saskatchewan, but also from British Columbia and Alberta. I also understand that there are some here from the United States, although not as many as in former years. Now since the United States has cast its lot in as an ally of Great Britain that fact will I think further cement the friendship between these two great countries in years to come.

Only in one section of the province has the question of irrigation been discussed to any extent. In the eastern portion in which I reside we do not hear very much about irrigation. In the southwestern portion there are, however, many irrigation projects. You who are here know a great deal of irrigation in the province in which you reside and you also know the trouble that there is in educating people to the need of irrigation in this portion of the province. There was a time in Alberta and South-western Saskatchewan from 1885 to 1895 when there was nothing but dry years apparently and they taught the people in those portions of the country the need of irrigation projects. After 1895 and for the last 15 years or 20 years we have not had a succession of dry years, yet the expenditure of money on irrigation has been justified on grounds of ensuring against dry years that might occur and one has occurred in the present year.

I think gatherings of this kind are to be commended. The great question before the people of this country and the United States is the question of production. In this country and the United States we are supplying men and means against autocracy which has grown up in Europe. From the United States great quantities of ammunition have been sent and also from Canada for some years now. Of late there has been a campaign for more production and the farmers in Canada and also in the United States are rising to the occasion and are putting forth greater efforts than before the war began. Patriotism and production are going hand in hand since the war began and I think we can make the statement that the man who is making two blades of grass grow where one grew before is a greater patriot now than before.

Now as I said before, I came here merely as a representative of the province of Saskatchewan for the purpose of welcoming the delegates from other parts of Canada and the United States and I might add that I truly hope that your discussions and addresses will lead to great benefit not only in this province but in the other parts of Canada. (Applause).

CHAIRMAN: The next address on the programme is with reference to dairying. Now dairying has not been gone into extensively yet because I think a lot of us came from the East, just to get away from the amount of hard work which that branch entails, but we are now beginning to see that although it requires hard work yet it is a necessity in agriculture. I may say that since the department has stepped in and taken a large interest in this matter there has been a great increase in dairymen throughout our province. In the northern portion of Saskatchewan dairying has been increasing continually, and I want to give you the assurance that so far as I have been able to size up the situation in this province, it is the man who is in diversified farming that is in the best standing in his town and with his banker. There is no doubt that there is certain amount of worry attached to grain growing exclusively that makes us become prematurely old. The man engaged in the dairy industry has a certain amount of assurance. The province of Alberta has had a start in this line, but we have increased also, but I will say that while we have not been giving preference over British Columbia dairy products, yet our products are fetching as much and in cases more in the market. I will now call upon Mr. F. M. Logan, assistant dairy commissioner, province of Saskatchewan, to address us on "Co-operative Dairying in Saskatchewan."

CO-OPERATIVE DAIRYING IN SASKATCHEWAN.

Mr. LOGAN: Mr. President, Ladies and Gentlemen.—I was thinking while sitting here this afternoon and listening to the excellent addresses, that it is a good thing for you irrigationists to get together once a year to compare notes and talk over your successes and reverses. A few days ago I was reading of a bankers' convention held in the East, when one banker said, "It is a good thing for us to get together once in a while to decide what should be done, who should be done, and who should do it," but of course the ideals of irrigationists are altogether different. I have had a little experience with irrigation in connection with a farm I have in British Columbia. Two years ago I spent all the spare cash I had and about all I could borrow to put in an irrigation system. That year it rained so much we did not need any additional water. We grew one hundred bushels to the acre of oats without irrigation. The next year we put in several acres of potatoes and I had a man who had little experience with irrigation, but who was anxious to learn. He thought water would be a good thing for the potatoes, and the more the better, so he rotted most of the potatoes, and I got no returns that year. This year probably the pipe line will blow up or the supply of water give out, so I am not looking for any beneficial results. But speaking about getting together. In looking around the walls I see the Union Jack along with the Stars and Stripes, This is a good thing and the people living under those flags should have gotten closer together years ago.

Now I did not come here to tell you stories but rather to tell you something of co-operative dairying in our province. I was surprised, to say the least, to receive a letter from your secretary asking me to speak at an irrigation convention on the subject of dairying. In earlier days, among some farmers at least, irrigation was closely allied with dairying, but the discovery and practical application of the "Babcock Test" has done much to disassociate these two subjects.

If I should tell you what I think about co-operative dairying in Saskatchewan you would think I was prejudiced in my opinions or was probably dispensing "warm ozone," but when I state that I have been associated with the dairy branch for only a little over two years and can claim little, if any, credit for what has been accomplished, you will, I hope, accept my statements without discount. The credit for what has been achieved in co-operative dairying throughout Saskatchewan is due in a large degree to the spirit of co-operation among the people and to the untiring efforts of the man who for the past ten years has filled the position of Dairy Commissioner, Mr. W. A. Wilson. I must not forget to say, however, that he has been most ably supported in this work by your chairman, the Hon. W. R. Motherwell, who during these years has occupied the position of Minister of Agriculture. Had the Dairy Commissioner not been given this support, the results to-day might have been quite different.

Co-operative Dairying Unique.

Co-operative dairying in Saskatchewan is, to say the least, unique. So far as I am able to learn it has developed along lines distinctly different from those followed in any other part of the world. It is true that co-operative dairying was first introduced in this province in the early nineties by the Dairy Department at Ottawa, but Ottawa proved too far from the scene of operations to manage successfully a business involving as many details as that of dairying, with the result that of the thirteen creameries built during these years, all except two were obliged through various causes to close their doors.

In 1905 the Hon. Mr. Motherwell joined the Saskatchewan Government as Minister of Agriculture under the leadership of the Hon. Walter Scott. It did not take him long to realize that, in some districts at least, the farmers of Saskatchewan could not live by wheat alone, so he established in connection with the Department of Agriculture a branch of dairying. The work of enthusing the farmers of Saskatchewan in dairying was not an easy task. Many of them had been lured to the West with the idea of making a fortune in grain growing and to get away from the close application to details necessary in successful dairying. The fact that co-operative creameries previously established had proven failures militated against the starting of new ones. Returns for dairy products were at that time low, and it was only by obtaining as large an output as possible and by keeping operating expenses at a minimum that a price could be paid for cream which would induce farmers to engage in this line of agriculture.

The usual custom throughout Canada in connection with co-operative creamery management was to appoint a board of directors from among the local shareholders and the business therewith, except for some suggestions from the Ottawa Dairy Branch, was conducted by them. It frequently happened that these men had little or no experience in the operation of a creamery, with the result that mistakes were often made which were fatal to the success of the enterprise and the closing of the creamery was in a great many cases the final result. To prevent further failures the Minister of Agriculture decided that when requested by any co-operative company the Dairy Branch would operate its creamery with little added cost to the company. This management consisted in employing help, purchasing supplies, paying the patrons, keeping the records, and the marketing of butter, and I think I shall be able to show you that large savings have been made, more economical management and more uniform and better butter has been the result.

In addition to the actual management of these creameries, the Government has also given financial assistance. In many localities where creameries have been established it would have been extremely difficult to sell sufficient shares to build and equip a modern creamery, so the Government loaned many of these companies from one to three thousand dollars each on long terms and at a favourable rate of interest. About $27,000 has been loaned in this way and over $20,000 has since been paid back. By each company paying a few hundred dollars annually from its current revenue it has made the tax on the farmers for the establishment of these creameries exceedingly light, and to-day they have a very valuable property practically free of debt. It has cost the Government practically nothing to provide this financial assistance.

To obtain an adequate supply of cream which was essential to economical operation it was necessary to provide in some cases for bringing cream a long distance, which meant increased express charges. To overcome this difficulty the Minister of Agriculture persuaded the Government to pay express charges on cream from the current revenue of the province. This made it possible to bring shipments from districts not sufficiently developed to support a creamery and at the same time aided established creameries in keeping down the relative cost of manufacture. This system, however, was not adopted as a permanent policy, and as the creameries became stronger and dairying became more popular this financial assistance was gradually withdrawn, and for the past few years only new creameries during their first year of operation have had their express charges paid from Government funds. While this policy was criticized rather severely at times the results have proven that it was wise legislation.

Cream Grading.

One of the features which has contributed in no small degree to the excellent reputation now held by the butter made at these co-operative creameries is that of grading the cream. In most of the older provinces in Canada no attempt has been made to pay for cream according to its quality. Thousands of dollars have been spent by these provinces in issuing bulletins; thousands of lectures have been given and thousands of inspections have been made, all urging farmers to take better care of their cream, but when the cream arrived at the creamery no selection was made, and one farmer received as much money for sour, badly flavoured cream, as another did for sweet cream of good flavour, with the result that little or no progress has been made towards improving the quality of the cream delivered.

One of the leaders in scientific dairying in Ontario stated at a recent dairymen's convention that the creamery butter produced in Ontario was not as good to-day as it was twenty years ago, and he attributed the cause to poorer cream which had resulted largely from the use of improperly washed hand separators. In 1912 the Dairy Branch adopted the system of grading cream and paying for it according to its worth or quality, and to say that this system has done more to improve the quality of cream received at the creameries than all the other methods employed is not exaggerating. Cream shipments are divided into three classes, Extra No. 1, No. 1, and No. 2. In making payments for butter fat two cents more is paid for the first grade than for the second, and three cents more for the second than for the third. It frequently occurs that one farmer receives a dollar more for a can of cream than does his neighbour for one of the same size. This is an object lesson for both which needs no further explanation. The good grade depends upon the care given the cream and to get that extra dollar a wise man will give the extra care. The effect of this system has been to so improve the quality that at some of the older creameries over eighty per cent of the cream received arrives in a sweet condition.

A better quality of cream is not the only result. After farmers have acquired the habit of taking more pains with their cream it is natural for them to exercise more care with their cows, to be more particular about feeding them and to keep the stable in a better condition. This naturally leads to a desire to know what each cow is producing and eventually daily records are kept and the work more intelligently carried

on. In time many of these men become real dairymen. This evolution will take place much quicker when farmers are shipping to a creamery where the cream is carefully graded and paid for according to its quality than if shipping to one where careless methods and poor quality obtain the same financial returns as does cream of the right quality.

In conjunction with cream grading, a systematic plan of butter grading has for several years been carefully carried out. Grading depots are operated at four central points in the province where cold storage facilities are, of course, available. Privately owned as well as the co-operative creameries of the province have been invited and practically all have made use of the grading facilities.

The system followed by the co-operative creameries might be described briefly as follows. Particulars of each churning are recorded, such as the pounds of cream of different grades, the average temperature of this cream when received, the temperature at which it is churned, time required for churning, temperature of the washing water, amount of colour used, if any, amount of salt used, time butter was worked, general appearance when churned, and other particulars are recorded. A large percentage of this butter is packed in 56-pound boxes, the inside of which is coated with paraffin-wax and then lined with heavy parchment paper. Each creamery is given a distinguishing letter and each churning a number, both of which are marked on the outside of every box of butter packed, and even though a box of this butter is held in cold storage for months or even years, it can be easily traced and all particulars obtained.

A copy of this churning report is put in an envelope tag and attached to one of the boxes filled from this particular churning. If the contents of this box prove unusual in any way the grader can refer to the churning report and probably detect the cause. As already mentioned this report shows the amount of cream of the different grades and if the butter maker is taking in extra No. 1 and No. 1 cream and turning out No. 2 butter there is evidently something wrong and the trouble can usually be detected. Upon the arrival of this butter at the grading station one or more boxes from each churning is carefully examined and a score card similar to that used at exhibitions is filled out and marks given for flavour, grain, salting, finish and colour. These cards are made out in triplicate and one sent to the Dairy Branch, one to the creamery where the butter was made, and one held by the grader. This system provides a constant check and guide for the men who do the work and is less expensive and far more effective in producing uniform butter of high quality than could be accomplished by the usual system of having inspectors make frequent visits to these creameries.

Arrangements have been made with the various railways along which these creameries are located to operate a cool car at least once a week between each creamery and the grading depots. This provides facilities for having the butter reach cold storage in good condition where it is held at a low temperature until sold.

When the butter is sold, grade certificates, showing the marks given each churning, and which are equivalent to certificates of quality, are forwarded by mail to the purchaser, and before the shipment arrives the buyer knows more about the quality of his purchase than if he spent half a day in a personal examination of the butter. It is needless to say this system is popular with the trade and many of the dealers do not care to purchase butter unless accompanied by a grade certificate. Every precaution is taken to maintain the standard indicated by this grade certificate. When it implies that the butter is No. 1 or special we try to be sure that it is not No. 2. The Dairy Branch fully realizes that the reputation of Saskatchewan butter depends to a large extent upon the use made of these grade certificates and while their abuse could seriously affect the present it could almost ruin the future of the industry. The advice of the Dairy Commissioner to our graders has always been that if in doubt about what grade to give a churning of butter to err on the safe side and give it the lower grade.

In co-operative dairying there is perhaps no feature of more marked advantage than the co-operative marketing of the butter. It is practically impossible to satisfactorily supply the Pacific coast or foreign markets unless the seller is in a position to fill orders on short notice of from one to ten cars. Few if any creameries in Canada have sufficient output to meet these requirements so the only practical way is for the butter from a number of creameries to be assembled at central points and after grading have it sold through one office. With our system of grading cream and the careful grading of each churning of butter it is possible to have fifteen or twenty or even more creameries produce butter which is almost uniform, so when a dealer buys five or ten carloads of the same grade he knows that his entire purchase is practically uniform in quality. This feature cannot be duplicated anywhere else in Canada because in the other provinces the creameries are practically all privately owned and operated singly, so there is not the same opportunity of purchasing butter in large quantities which has been manufactured, graded and sold under the control of one office.

By following the system already outlined the butter made by the co-operative creameries of Saskatchewan enjoys a reputation which any province might well be proud of.

Four years ago the dealers on the Pacific coast were willing to pay from two to five cents more for New Zealand butter than they would for any Canadian make. During recent years a gradual improvement has been made in Western butter and I am informed on good authority that to-day the same dealers will pay as much for the butter made by the co-operative creamers of Saskatchewan as they will for the best New Zealand grades, and at the same time will pay from one to two cents more for it than they will for the once famous Eastern Townships' butter.

The Pacific coast, however, is not the only place where this butter can be marketed. A carload was sent to Montreal in March of this year on consignment and the brokers found it so satisfactory that they were able to dispose of it at one and one-half to two cents in advance of local makes, writing that the flavour was excellent and the workmanship about perfect.

As further evidence of the quality of Western Canada butter, I might mention the result of a trial shipment sent to England last fall. The Dairy Commissioners for Manitoba, Alberta and Saskatchewan made up a carload and forwarded to the Bristol market. The brokers to whom it was consigned wrote that it gave excellent satisfaction and they considered it "the finest lot of butter ever received from Canada." With a reputation for quality such as I have outlined it is no exaggeration to say that the butter produced by the Co-operative Creameries of Saskatchewan sells at a premium of at least two cents per pound in advance of what it would bring if each creamery were operated separately and the butter marketed in the same way. With an output of two or three million pounds an additional two cents per pound amounts to a sum of considerable size. Under the co-operative system the farmers who produce the cream obtain the entire benefit of this premium as it costs no more, in fact, less to manufacture butter under this system than it would if each creamery were operated singly.

Three systems have been adopted in paying for cream shipments. At several of the creameries cheques are issued for each can of cream, but for most of the cream current prices are paid by cheque every two weeks, and at the end of the financial year a final payment or dividend is usually available. Last year more than $17,000 was distributed among our patrons as a final payment. Had these creameries been operated by private companies it is quite safe to say that little if any of this sum would have found its way into the pockets of the farmers.

While development in dairying throughout Saskatchewan has not been phenomenal or perhaps even as great as it might have been during these years, it has been consistent and uniform and an excellent foundation has been laid for the future.

As I have already stated the growth has not been phenomenal, but it has been, I think, more than ordinary. Ten years ago four small creameries were operated with

205 patrons and an annual output of 88,000 pounds of butter. To-day we have 19 creameries in operation with more than 7,000 patrons and while it is too early to state definitely, the output will probably be between two and one-half and three million pounds, and yet this is only a small percentage of what these co-operative creameries will some day produce.

An outline of the co-operative creameries of Saskatchewan would not be complete without some reference to their amalgamation into one co-operative company. While these creameries have been satisfactorily operated during the past ten years it was decided that under the system followed they were not on as permanent a basis as they might be. The custom has been for the dairy branch to obtain an annual lease of these creameries. The tendency in all cases has been to renew these leases, but there was no guarantee that this would continue to be done, and while we might have two or three million pounds of butter to market this year, it was possible that we should have none next year as each company might decide to operate its own plant, so the development of permanent butter markets under such conditions would be far from satisfactory. In addition to the immediate operation of these creameries their future development had to be considered. Work of a permanent nature could not well be undertaken on the basis of an annual lease, so the amalgamation of all these creameries seemed to offer a solution to the difficulty and was undoubtedly a move in the right direction. I predict for the new company a big future.

Its ability to provide an unlimited and profitable market for all the cream the farmers can produce is only one of the services this company can render.

The egg and poultry industry of this province is capable of almost unlimited expansion. It is estimated that there are 150,000 farmers in Saskatchewan, any one of which could keep at least 100 hens, and some of them many more. With 100 eggs to the credit of each hen, which is a low average, it would mean an egg production of 1,500,000,000 and at two cents each would be worth $30,000,000. With 100 head of poultry to sell from each farm, the revenue from this source alone would amount annually to $7,500,000 or a total revenue of over $37,000,000. The farmers interested in dairying will be the first to become interested in poultry and egg production, and through the medium of the creamery and cold storage facilities, the industry can be developed more successfully than in any other way. Seldom if ever has such an opportunity for service awaited a new company.

Another feature which can be successfully carried on in conjunction with the creamery and poultry industry is that of co-operative cold storage. Sufficient work has already been done along this line to demonstrate the usefulness and practical possibilities of these plants. Cold storage warehouses of a practical size can be constructed at central points in the province, and in addition to being self-sustaining can provide storage facilities for farmers in these localities who wish to store their winter's supply of perishable provisions, and also provide storage facilities for merchants, brokers and others requiring such space. This province is in need of fifteen to twenty such plants at the present time.

When we consider the opportunity for development and the still greater opportunity for service, one is forced to the conclusion that the possibilities of the new co-operative company are limited only by the energy and ability the management can give to the enterprise. It is contemplated that the Dairy Branch will retire from the active management of these creameries and that this work will be taken over by the new company about November 1 of this year. Its future will undoubtedly be watched with keen interest by thousands who are personally and financially interested.

Saskatchewan has been singularly successful in co-operative undertakings, and I look forward with confidence to the time when the Co-operative Creameries, Limited, will prove one of the most successful.

The CHAIRMAN: I would like to supplement and probably accentuate one of the points made by Mr. Logan. We do not wish to say that we make better butter than any one else, but we do say that whatever certificate we attach to the butter we live

right up to it, and that is what commends our butter to the buyers. Mr. Wilson's certificate on butter is getting to mean just as much as Mr. Peter Horne's certificate means on grain in the Liverpool markets, and the buyers know that whatever that certificate calls for the grain will be found to be the same. I visited the big export dealers in Vancouver and I got first hand from them the statement that they could always bet on Mr. Wilson's certificate and that as long as that would be the case they would be glad to get our products. You have been reading about the alleged atrocities in cold storage in Ontario. We do not desire to start anything of that kind in connection with our cold storage plants. If the consumer believes that such might be started here all they would need to do would be to buy their butter and case it and their meats too, buying it at the time they wanted to and then store it in our cold storage plants, as by law they are entitled to store whatever they buy. I may say that the cold storage plant at Wanda is used by farmers living within fifty miles around there.

We believe in each district forming its own conditions for its particular industry. If it is grain growing, then grow grain, and if it is ranching, then ranch, and if dairying, then carry on dairying. We believe in diversified farming. You take the districts of Wadena and Lloydminster where the established industries are oat growing and dairying. There are districts more adapted for grain growing than for dairying. Whatever your district is adapted for work under those conditions and diversify in other respects. We would not think of recommending dairying in places where it is not suitable. We believe to-day if we had three or four inches of water at the right time on our pastures in Saskatchewan that it would increase our dairying output by 25 per cent.

THURSDAY MORNING SESSION—AUGUST 2nd.

CHAIRMAN: The first speaker this morning is Mr. James Johnstone, of Nelson, British Columbia, who will speak on "Interprovincial Co-operation."

Mr. JOHNSTONE: The greatest permanent prosperity of the Canadian West will in future depend upon the extent to which co-operation is entered into between the farmers east and those west of the Rocky mountains.

Here on the plains you produce the finest wheat in the world, which is the staff of life, and the chief food for man and beast throughout the world.

On the Pacific slopes in British Columbia we can also produce the finest of grains, but owing to the expense of clearing and preparing the land for its cultivation we do not attempt to produce grains in competition with the farmers on the plains. We in British Columbia are situated in a climate and amid surroundings which produce the very finest of all kinds of fruits which are indigenous to the temperate zone. Fresh ripe fruit is one of the most healthful of foods and is essential to maintaining the body in perfect health. You of the plains, therefore, require our fruits which we produce to perfection, and we of the mountains require your grains, not only for ourselves but for our flocks and herds, the maintenance of which is essential to the continued fertility of the orchards. As we in British Columbia require your products and you require ours, and as we are all producers direct from the soil, we should devise some better means of interprovincial co-operation than we have at present—which is in reality no co-operation whatever.

The distance between these areas of greatly diversified production is only a few hundred miles, far nearer than any other diversified areas of a similar character.

Such proximity should be of the very greatest commercial advantage to the producers in British Columbia, Alberta and Saskatchewan, but we are not taking advantage of it as we should.

We, in British Columbia, purchase a large tonnage of feed and grain from the States lying to the south of us, which we should purchase from you; and you purchase a large quantity of fruit from the States lying to the south of British Columbia which you should purchase from us. Now this lack of what I might call national co-operation and fore-thought is certainly not caused by quality. Your wheat and farm products stand first in quality, not only on this continent but throughout the world, and our fruit has won the highest awards for quality at the Royal Horticultural Society in London and at various exhibitions throughout the United States. Only last month I received from the Secretary of the Panama Pacific International Exposition their gold medal and diploma for a variety of cherry which was not only originated in California, but which is considered the best cherry grown in the States. They also awarded me a diploma and their silver medal for an European variety of cherry. With these facts before us surely you should get the best of fruit and we the best of grain and feed, but we do not do so by any means, and it is our own fault. Providence helps those who help themselves, and so far our past want of co-operation does not deserve anything better than we have been receiving. I often see fruit for sale in the city stores of the prairie provinces which no British Columbia man would touch and which even his pigs might not relish at home, and I have often purchased milling feeds at high prices ($40 to $60 per ton) which contained a large percentage of crushed straw and as for No. 3 wheat purchased for chicken feed, I am certain your plump hens would pass it by and not recognize it as feed fit for them.

This fearful war in which we are engaged has taught us the vital importance of developing our own resources within the Empire, and thus in times of emergencies to be absolutely independent of our supplies from foreign sources.

During the strenuous conditions in which we are living too great stress cannot be laid upon the importance of interprovincial co-operation. It should be our privilege and duty to co-operate in every way and assist each other by using each other's produce. If we do not do so, others will circumvent our wonderful opportunities; other fruits of perhaps less nutritive value may come into general use and even your famous wheat may not always be held essential. Even now in Denver, Colorado, a factory is turning out bread, cakes and biscuits which are claimed to be delicious and of greater food value than those made from wheat or oats. Let us then be up and doing—boosting and using our own good products among ourselves, for every dollar we send out of Canada is lost to our country. Out of every dollar we exchange among ourselves a certain proportion will again return to our pockets.

Individual effort will accomplish the desired end better than any association or organization which might be formed. Let us each one purchase home-grown and home-manufactured products only and our dealers will soon cease to purchase goods which we leave on their hands. In some instances we might have to be put to a little inconvenience for a short time, but surely we should consider such small sacrifice a privilege in being able to do our bit in the upbuilding of our Empire's resources.

CHAIRMAN: Mr. Johnstone is kindly allowing Mayor Annable, of Nelson, B.C., a few minutes of his time to say a few words.

Mayor ANNABLE: As I have to leave the convention this evening, my friend, Mr. James Johnstone, and myself desire to invite the members of the Western Canada Irrigation Association to hold their next convention at Nelson. I believe it has been the custom for the convention to alternately visit the prairie and the mountain section, and next year it is due to visit British Columbia. We adopt the dry farming method more in the vicinity of Nelson. We not only cultivate the surface of the earth in our country, but we dig down some hundreds of feet and we dig out wealth from the ground. From Government statistics British Columbia has produced $454,000,000 from the mountain depths of the earth in minerals. Gold having a standard value is not any greater than before the war, while copper, lead, zinc and silver are double

their previous price, therefore gold mines have almost ceased to operate and copper, lead and silver mines are operating to their fullest extent. One reason for the closing up of the gold mines is on account of the labour required to develop the lead, copper and other properties. Gold having a standard value is the same any time it is taken out. Therefore when labour is cheaper and powder one-quarter of what it is to-day, the gold mines will then start operating again. While I do not wish to take any advantage in getting in ahead and inviting you to Nelson, the reason I am doing this to-day is because I will have to leave this evening.

If you can come to Nelson next year we will try as citizens of that city to keep up the hospitality which has been extended to the association at the other places where the conventions have been held. Although the standard has been set rather high, we will endeavour to keep it up. We have the largest motor boat fleet in America in proportion to the size of the city on Kootenay lake. We have the largest smelter in the British Empire having a pay-roll of $200,000 a month. If you will come there we will endeavour to arrange a trip to the smelter and a trip on the Kootenay and also a few hours under Mr. Johnstone's cherries.

The word "Kootenay" is an Indian name meaning "water people." Now, while we are particularly fond of water we would say that we have not yet banished from our midst the refreshments that you have done away with, but if we have not by the time you come and you should forget that it is water you are accustomed to drink, we will do our best to take care of you. (Applause.)

CHAIRMAN: You will see that we are not at least going to be homeless for our next convention. We have five minutes left for discussion on Mr. Johnstone's paper. There is something left to say in the matter and I might lead you by saying that there is one kind of inter-provincial trade that we should like to have cut out. Speaking generally there is no friendship in trade, but I believe there is a real desire to have inter-provincial trade. When I went to British Columbia in regard to our butter trade I found a real desire in British Columbia to trade with the prairie provinces. However, we must always see that two or three things are provided before we can expect to have development in inter-provincial trade. That is, you must be prepared to give the article the other man wants when he wants it and also at a reasonable price. There is only one trade that we want to have cut out and that is the liquor trade. However, I believe it was only through a fluke that this has not been done. Now, if there are any others who want to discuss the question of inter-provincial co-operation, we should hear from them.

The old saying that there is no friendship in trade is not true, but in my opinion there must not be too much difference between what one province wants to give you and what you want and neither must there be a big difference in the price that the one wants. The economic side of the trade must not be lost sight of. Other things being equal we can always develop inter-provincial trade and co-operation along our lines and also along other lines.

Mr. Dqn. H. Bark, Chief of Irrigation Investigation Division, Department of Natural Resources, Canadian Pacific Railway, will now address us on:—

Alfalfa Growing in Western Canada.

Mr. BARK: I was very sorry to be unable to be here yesterday, but still I feel that I am somewhat fortunate, for if I had heard what the other speakers had to say about alfalfa I would, no doubt, have been somewhat embarrassed in following them, as they, no doubt, completely covered the subject. You delegates, on the other hand, are perhaps unlucky, for not having heard the other speakers discuss the subject of alfalfa, I am bound to make more or less repetition.

The subject of alfalfa, Ladies and Gentlemen, is such a great one that I cannot hope to cover it in the short time at my disposal, but I shall do my best. Not knowing what the other gentlemen have said on the subject I cannot do otherwise but try to cover at least certain phases of it more or less completely. I feel and believe that alfalfa is one of the most valuable of the forage crops that it is possible for us to produce in the Prairie Provinces. It excels all other forage plants in yield, low cost of production, feeding value, and beneficial effect on the soil. Though this is an irrigation convention we will have to admit that alfalfa will do very well on dry farms provided a reasonable amount of rainfall occurs. Generally speaking, however, the more moisture there is available the more tonnage of alfalfa there will be produced. It would seldom rain too much in our Western Prairie Provinces for the maximum production of alfalfa, providing the crop is planted on a well drained soil. If it is too dry for the production of a medium crop of grain on summer fallow one cannot expect a good yield from alfalfa unless it is planted in rows and cultivated so as to conserve the moisture. There is no doubt that if alfalfa is handled in this manner a fair crop may be produced in all but the driest of seasons. In such cases it is usually possible to produce a very profitable crop of seed.

Time will not permit me to discuss at any length the great value alfalfa has as a food for practically all classes of stock. I think I can take it for granted that most of you already know of its great value as a hay for dairy cows and for beef cattle, as well as for sheep, horses, and hogs. It makes an ideal pasture for hogs and horses, but due to the losses from bloating, in my experience, it is never profitable to pasture either cattle or sheep upon it. I have seen many men who have had long years of experience in this matter, however, and who claim that it is possible to pasture alfalfa without danger from bloat, yet, these same men sooner or later have usually given up the practice. I have not seen sheep or cattle pastured on alfalfa in Alberta. It may be that there is some peculiarity about our climate that will permit the successful pasturing with these two classes of live stock without loss. If any one wishes to try it, the stock should by all means be turned on the pasture only when well fed and full of some other forage. They should then be kept upon the alfalfa and not taken out so as to allow them to become real hungry. One of the great dangers lies in allowing them to eat too much at one time.

As a hay, alfalfa is relished by cattle, horses and sheep, though in some cases they must be taught to eat it at the start. It is practically the only hay that is adapted as a dry forage for hogs. I do not know of any other forage that hogs will eat so much of and do well upon in the dry state as alfalfa. I well remember a man from the East who worked with me in the early days of an irrigation project in Idaho. He had never had any experience with alfalfa prior to coming to the West and was certainly surprised to learn that hogs liked hay. He told how the first western farmer he had ever worked for had asked him to feed the hogs some hay, that he failed to do so thinking that the boss was joking with him, but that he was much surprised when the said boss later on in the day fed the hogs himself and stated, "You ought to have seen those hogs eat."

One of the greatest values of alfalfa to our Prairie Provinces is in the fertilizing effect it has on the soil. We must practise crop rotation if maximum returns are to be made from our crops year after year. There is no soil in Western Canada or in any other section that will stand continuous cropping to grain year after year and still continue to give maximum returns. Some fertilization, either application of manure, or that furnished by a rotation with leguminous crops must be added to the soil. Though we have a fair supply of humus to start with it is not sufficient to raise maximum crops of grain for more than a few years at the most. In the regions further south where but little can be raised without irrigation, there is but little humus in the prairie sage brush at the outset. One can raise very good crops of grain for a couple of years after which the yield begins to decrease very rapidly.

I have seen two farmers move to a new project and settle on sage brush land at the same time just across the fence from one another. One would plant his farm to wheat and the other to alfalfa. The first man would produce forty bushels of wheat per acre the first year, thirty bushels the second, twenty the third, and ten bushels or less of very inferior wheat the fourth year. The farmer who planted his farm to alfalfa just across the fence at the same time and upon the same soil with the same climatic conditions would plough up his alfalfa at the end of the third year, after having produced very profitable returns during the second and third years, and the fourth year when his neighbour was producing only ten bushels of wheat per acre, the yield on the alfalfa sod adjoining would be eighty bushels per acre of the finest wheat in the neighbourhood. This, of course, sounds like a high yield, but eighty and even ninety bushels of soft wheat have been quite commonly produced on alfalfa sod in the states of Idaho and Utah.

During the past year we have ploughed up some alfalfa on our Brooks Demonstration Farm. It is the first alfalfa sod to my knowledge that has been broken in that immediate section. The farmers nearby mostly admitted that alfalfa would fertilize the ground, but were much surprised to learn that we intended to plant wheat upon it. It was said, it would grow too tall and would lodge, or that if it did not lodge it would never ripen, yet the grain on this alfalfa sod is now beginning to ripen. It will no doubt be cut as early as the average of any of the other grain in that section, thus proving, for it has not lodged, that we can grow grain on alfalfa sod and have it ripen normally and as early as grain on other soils, and I assure you that this wheat will be equal in yield of any wheat in that section. I remember the results of experiments carried on by myself and my assistants while in the employ of the United States Department of Agriculture in Idaho, where the yields of grain and potatoes on alfalfa sod were more than double those on similar adjacent fields that had never produced alfalfa. In my opinion alfalfa sod given better results than a heavy coating of manure, and I wish to impress upon you before leaving this phase of the subject, that the value of alfalfa as a fertilizer is second only to its great feeding value.

It is always rather difficult to kill out a good stand of alfalfa. I have actually seen men grub alfalfa out with a grub hoe in their pasture for fear it would bloat their valuable dairy cows even after the alfalfa had been ploughed twice to be sure of killing completely. One of the best methods of killing alfalfa is to plough it shallow in the fall after the last crop is cut. It should then be disced and harrowed thoroughly so as to uncover as many of the crowns as possible in order that the action of the weather during the winter may be as severe as possible. In the spring, after the shallow ploughing in the fall, it should be again ploughed approximately two inches deeper than the original ploughing in the fall which turns all of the crowns underneath where they add considerable fertility after decomposition. Care should be used in ploughing alfalfa in order that all of the roots may be cut. The plough must be kept sharp.

One can see alfalfa grow on a great variety of soil types, varying from the finest of adobe clay to the coarsest of gravel. The soil best adapted to alfalfa is a clay loam of good depth with a medium texture, and it must have good drainage, both surface and subterranean. This crop cannot withstand either water standing on the surface nor at a shallow depth underneath the surface. Given soil conditions like those just described and plenty of moisture furnished by either rainfall or irrigation, and alfalfa should make maximum returns. Where alfalfa is planted on land that is to be irrigated it is well to select a rather good slope of from ten to twenty feet per mile, even fifty feet per mile not being excessive. An average slope of five feet per mile would be considered too flat for good surface drainage. Never plant alfalfa on a pothole or in a depression without surface drainage for, even though you do not expect to irrigate it the water supplied by the melting snows in the spring before the frost has left the ground will be liable to either drown out or damage the crop.

It is a fact which cannot be controverted that any certain crop on a certain soil in a certain season requires a certain specific amount of water if a maximum crop is to be produced. If more water should be applied than the soil or crop needs crop production is bound to be decreased, the decrease depending upon the excess amount of water supplied. On the other hand if insufficient water for the best needs of the crop is supplied a maximum crop cannot be produced. It will be seen, therefore, that for the best results under irrigation one must not only know the needs of his soil and crop but his land must be so prepared that he can apply the certain specific amount required at the proper time. It is therefore apparent that even with irrigation a maximum crop cannot be produced upon all parts of the area unless it is so prepared that the water can be applied evenly to all parts of its surface. For best results, therefore, it is necessary to smooth up one's land, filling the depressions and cutting off the larger knolls with a Fresno scraper, after which the entire field to be planted should be levelled with a home-made float leveller, with which tool I hope all of you irrigators are familiar. Too much stress cannot be laid upon the careful preparation of one's land for irrigation, for, in many cases, the success or failure of the farmer will very largely depend upon his ability to make this even application of water to his field, upon which maximum crop production so greatly depends. The need for the levelling of the land does not apply specifically to alfalfa alone but to all other crops which are produced under irrigation, but, fortunately when the land has once been prepared so that it may be irrigated evenly it can be maintained in this condition for the first and successive crops at but a very slight expense.

There are several types of irrigation systems in use. The first and the crudest system of irrigation ever invented was the free-flooding system where the ditches or creeks are dammed up and the water is turned down the draws and allowed to flood out over the land by diverting here and there if necessary by dirt, brush or manure dams so as to flood out and wet as much of the surface as possible. This system, as has been said, is very crude and is not adapted even to hay meadows, for even distribution of water with it is impossible. Part of the field is bound to get too much water while other parts may not be reached at all. This free-flooding system just described, because of the over irrigation, is bound to make in many places waterlogs and spoils much land, after which it frequently costs more to drain and reclaim than an efficient irrigation system would have cost at the outset.

The next type of irrigation system devised was that of flooding between rectangular or contour checks. This type of system was constructed by placing a dyke clear around different areas of the same elevation and flooding the water into these areas enclosed by the dykes until all of the ground surface was covered. This system too has its advantages and costs a considerable amount per acre for its proper installation.

Another system that is now widely used is the furrow system of irrigation where the water is run across the field from the head ditch in small parallel furrows, the water being run in these furrows until the moisture has soaked across and moistened all of the soil between them. These furrows are usually from three to five inches deep and from two to four feet apart, depending on the type of soil encountered. The more porous the soil the greater would be the space between the furrows.

The best system yet devised, however, in my opinion, for the irrigation of alfalfa, is flooding between borders. The land is levelled off much the same way as for efficient irrigation with any other system. Parallel dykes from 35 to 75 feet apart are run down the greatest slope unless this is excessive or more than 75 feet per mile. These dykes are rather broad and low. They should be about three feet broad and about six inches high in the middle so as to permit of the passage of wagons and haying tools without inconvenience. The water is then flooded across the land between these parallel borders or guiding dykes in a very efficient manner. In order to be ideally prepared for this system the slope or side fall between the borders should all be taken out in the levelling, but much of this can usually be eliminated

by laying out the borders in the proper direction at the outset. The time will not permit of a more lengthy explanation of this system, and I shall refer any of those interested to a bulletin published by the Department of Natural Resources of the Canadian Pacific Railway, entitled, "Alfalfa." In this I have endeavoured to describe the preparation of the border system in such a manner that any one with a knowledge of irrigation could readily instal such a system on their own land. This bulletin can be secured by writing me at Strathmore, Alberta.

A compact, clean, mellow seed bed should be prepared for alfalfa. The seeds of this plant are small and the young plants are rather puny at the start. They, therefore, need the best chance that you can give them. Do not plant your alfalfa too deep, never less than one-half inch nor more than one and one-half inches deep is a safe rule to follow. Opinions differ as to the amount of seed that should be sown to the acre. Ten pounds of seed if evenly applied to an acre would place fifty-two seeds upon each and every square foot. Of course, it is impossible to have all of them grow, but given seed of good germination one should secure a very good stand on a proper seed bed with fifteen pounds of seed per acre. This is the amount we are recommending in Alberta. This could be put in either broadcast or with a grain drill. There would not be much difference between the two methods so long as the proper depth of planting was secured. For any part of Alberta or Saskatchewan I should think that the period between May 15 and July 15 would be the best time to plant alfalfa, the sooner after May 15 that it can be planted the better as proper moisture conditions are secured. Do not plant alfalfa with a grain crop. Alfalfa requires much sunlight and will always do better alone. If it attains sufficient height by August 1, it can be clipped. This should be done leaving the first growth on the ground. It is not thought, however, that it would be good practice to clip the first year after August 1, as the young plant unquestionably needs considerable fall growth in order to be able to withstand our rigorous winters in the best possible manner. While there may be some soils and localities in Alberta or Saskatchewan where alfalfa does not require inoculation it is best to be on the safe side and inoculate. Failure to do this probably has been one of the greatest and one of the most frequent causes of failure in the growing of this crop in these provinces. Inoculation can be done either with the culture applied to the seed or by applying soil from the old alfalfa fields that one is sure is inoculated. Any of your provincial experiment stations will gladly give you complete and explicit directions for the inoculation of your alfalfa.

The subject of harvesting the crop is a considerable problem in this section. In order to have the greatest possible feeding value and to bring the best possible price on the market alfalfa must be so cured that it is green in colour, and that as large a percentage of its leaves as possible must be retained. In order to cure alfalfa in this manner it should be cut when it starts to bloom, more properly, when the basal shoots or second growth start up around the crown near the ground. Assuming that it is a drying hot day one should cut the alfalfa in the morning and rake it into windrows in the afternoon; it should then still be moist and sappy but should no doubt be ready to place in small cocks or piles in the afternoon of the second day. In order to cure the crop properly it must not be allowed to bleach but should be cured in as large a pile as possible so that but a small portion of it will be exposed to the direct rays of the sun. The time to stack alfalfa is hard to explain. The alfalfa grower's intuition or sixth sense tells him when to stack. One rule that can be laid down is that water on the hay (from the rain) does more harm than water in the hay. It is usually considered ready for stacking when the stems are so dry and brittle that they will crack, but not break entirely when twisted in the hand. A little practice in regard to this matter will soon tell one when alfalfa is ready to stack. It is needless to say that the hay should be placed in a large well topped, well built stack with as little surface exposed to the weather as possible. It is a good plan, usually to top the stack with plenty of timothy hay as this hay will shed water better than alfalfa.

Before I close I must say something about the hardiness and vitality of alfalfa, as this factor is one which gives considerable concern because of our rigorous northern climate. Alfalfa was originally a desert plant from a region far milder than this, and one hundred years ago could not possibly have lived through one of our winters. It has been brought northward, however, the weaker plants having been repeatedly killed off, thus permitting the seed of the succeeding generations to have been borne only by the most hardy plants in each case, which has resulted in increasing the hardiness of alfalfa sufficiently so that it can be grown with profit and but little loss through winter-killing throughout the greater portion of Alberta and Saskatchewan, provided, however, that only the more hardy varieties or strains are used. Time will not permit me to say more in regard to the history of alfalfa. The varieties that have given the best results in central Alberta are the Grimm, seed from Northern Turkestan, and locally-grown seed. It has not been possible, however, to secure seed of the above mentioned varieties or strains in sufficient quantities and the remainder of the seed required has been imported mostly from northern Montana, which has a climate only slightly less rigorous than our own. The Montana-grown seed has given fair results but has been subject during the past two winters to considerable winter-killing in the central part of our province. Considerable investigation has shown that the Grimm is practically the only seed that has been almost free from winter-killing, and in the future we are going to recommend the planting of as much of this seed as possible. The unfortunate part about it is that the seed from pure Grimm stock is scarce and high in price, but we hope to overcome this factor by producing as much as possible of it at home.

In conclusion, I wish to emphasize a few of the more important factors in connection with the planting, growing, irrigating and harvesting of alfalfa. Do not under-estimate the feeding value, as speaking broadly, there is no other forage we can produce that can compare with it in feeding value, acre yield, and fertilizing effect upon the soil. Be sure that you have secured seed of the most hardy strain obtainable. Get Grimm seed if you can. Plant it on well-drained soil and on a well-prepared seed bed at the rate of approximately fifteen pounds per acre. Inoculate it. Do not plant it less than one-half nor more than one and one-half inches deep. Leave plenty of growth on it the first fall when it goes into winter quarters and see to it that it has a proper supply of moisture, and I believe you will have good success with alfalfa. (Applause.)

A DELEGATE: I would like to ask, if after you have ploughed up your alfalfa and grown two or three crops of other things is it necessary to re-inoculate?

MR. BARK: It is not usually considered so. It depends upon how long the alfalfa was in there and the proximity of other alfalfa. If alfalfa was planted and growing alongside of the field, I do not think I would. Still, on the other hand, it is easy to inoculate by the culture method. Twenty-five cents worth of culture from the experimental station will give you enough to inoculate sixty pounds of seed, so it would not cost very much to inoculate again and looking at it from that standpoint one could hardly afford to take any chances whatever with it.

The CHAIRMAN: There is one very important point brought out this morning and yesterday in the matter of the destruction of alfalfa. They practically all agree that the movement towards destroying alfalfa is the fall ploughing. If you want to destroy any kind of perennial weed, the time to do it is to attack it in the fall, particularly when the ground is dry. That applies to quack grass, brome grass and even thistles. The time to get your first innings at it is in the fall. Leaving it until spring leaves it in a bad condition for a start. I think that applies to all our weeds as well as the killing of alfalfa and it is something that we desire to know very much in Western agriculture at the present time, particularly with regard to our own grasses, including quack grass.

I now call upon Professor L. S. Klinck, Dean of the Faculty of Agriculture, University of British Columbia.

FIELD CORN FOR FODDER AND ENSILAGE.

Prof. KLINCK: It is with the greatest of pleasure that I have listened to the practical address of the previous speaker. As Mr. Bark's knowledge of his subject is born of a first-hand working acquaintance with it in all its many details it is only natural that the enthusiasm, which always characterizes him when speaking on his favourite theme, should become contagious.

The subject assigned to me, "Corn and Corn Growing" is one in which the active interest of prairie farmers is increasing from year to year. Twenty years ago, outside of comparatively limited districts in Ontario, practically no attention was paid to this important cereal in any part of Canada. With the development of the live stock industry, and especially with the expansion in dairying, came a demand for a high-yielding, succulent crop which would supply an abundance of palatable roughage at a low cost per ton. Corn was the crop which met these requirements most nearly, and, as a result, its cultivation has become general throughout Central and Eastern Canada wherever the growing period is sufficiently long to ensure its normal development in an average season. To-day we find many prairie farmers evincing a keen interest in this crop, and not a few who are growing it with satisfactory results. Some who have attempted its culture have not met with success, but not infrequently their failure has been directly attributable to their lack of acquaintance with the requirements of the crop, to their inability to procure suitable seed, or to their failure to observe approved methods of culture.

Before entering upon the discussion of this subject it is only fair to state that I have never grown an acre of corn in the province of Saskatchewan. For a number of years I have visited the agricultural colleges and many of the experiment stations in the Prairie Provinces and have observed closely the results of the many experiments being conducted with this crop. My practical experience with corn and its culture has been gained principally in the corn belt of the middle western states and in the provinces of Quebec and of Ontario. In discussing this subject, therefore, I shall confine myself mainly to those principles in corn growing which are of broadest application. To Professor Bracken, of the University of Saskatchewan, and to Mr. W. H. Fairfield, Superintendent of the Experimental Farm at Lethbridge, my thanks are due for the assistance they have given me in my attempt to make the treatment of this subject of the greatest practical value to the farmers of the Prairie Provinces.

Farmers in Western Canada are interested in corn because wherever it can be successfully grown it gives a heavy tonnage of palatable, succulent roughage at a low cost per ton. In live stock districts where the culture of root crops is not general it is becoming increasingly recognized that more attention must be paid to succulent roughages. Corn is one of the most widely adaptable of these and as a result its culture is being rapidly extended.

In consideration of this subject the first essential to demand attention is that of the class of corn best adapted to meet the requirements of a given district. The shorter the season the more important it is that an early-maturing sort be procured. Flint corns are, as a class, earlier maturers than dents. It is among the flints, therefore, that we must look for our earliest ripening corns.

Among the commercial varieties of this class the many-coloured Squaw stands first. Being very early, the yield of stalk and leaf is much less than that of varieties requiring a longer season to reach the glazing stage. The next in order of earliness is the Free Press. Although a little later in maturing, this variety gives, on an average, a somewhat higher yield of fodder than the Squaw. The Jehu produces about the same average tonnage as the Free Press and has proved itself an

excellent variety. Next in the list comes Quebec No. 28. This improved strain was isolated at Macdonald College by means of the ear-row method of selection and is now grown to some extent in all the provinces of Canada. Another standard flint corn is the Longfellow. This variety is more cylindrical than any of the others and carries but eight rows of kernels. In common with all eight-rowed corns its kernels are larger than those of the twelve-rowed varieties. Compton's Early is a vigorous-growing, twelve-rowed, yellow dent which is very popular in many districts, but it is too late in maturing for general culture in Saskatchewan.

In districts with longer growing seasons, and with higher temperatures than those required for Quebec No. 28, or Longfellow, the Northwest Yellow Dent or an early maturing strain of White Cap Yellow Dent might advantageously be grown.

In purchasing seed corn the buyer should remember that corn differs from small grains in that, as a rule, the larger the grain the more days will the crop require to mature. The size of the kernel in any given class constitutes a fairly reliable indication as to the length of growing season required.

Seed corn should be purchased in the ear rather than shelled. Ear corn is somewhat higher in price than shelled but almost invariably the quality is better. Most seed corn which is low in vitality has been injured either as a result of freezing or of imperfect storage. In either event evidences of this lack of care are more easily detected before the ears have been shelled than afterwards. Moreover, evidences of breeding or lack of breeding are much more readily determined when the corn is on the cob. The growing practice of demanding seed corn on the ear has done more than any other single factor to ensure a dependable supply of acclimatized seed.

A careful germination test should be made of all corn intended for seed purposes. Such a test not only shows the germinating power of the sample but gives a fairly accurate idea as to its ability to produce strong, vigorous plants.

Corn is a semi-tropical plant. It responds, therefore, to a warm, friable soil, especially one which is fairly retentive of moisture. A soil of this nature should ensure a good return, even in case the rainfall is light, provided there is a fair supply of moisture at the time the corn is planted.

While better yields of wheat and oats have frequently been obtained after corn than after summer-fallow, one would not be justified in concluding that corn will displace the fallow in this province. Where the rainfall is heavy enough to admit of the corn crop being sown on what is now fallowed land, a well-tilled crop may take the place of clean cultivation to a certain extent, but it is doubtful if the practice will ever become general in the drier sections of the prairies.

Your chairman, a few moments ago, referred to the difficulties which confront you in your perennial fight with weeds. In this respect your experience coincides with that of the farmers in the older settled parts of Canada. Their solution of the weed problem lay, not in dispensing with the fallow but in supplementing it with the growing of hoed crops which enabled them to keep the weeds in check and at the same time obtain, from their inter-tilled land, a large return in succulent feed for their live stock.

The preparation for the seedbed will depend upon the soil and upon the kind of weeds present. If the land is overrun with grass it should be ploughed in the fall; if the weeds are neither numerous nor persistent, deep fall cultivation will reduce their numbers very materially and so will lessen the amount of inter-tillage required during the time the crop is growing.

So far as the applying of fertilizers goes, I take it there is but one in which you are interested—yard manure. In parts of the eastern provinces, where the season is short, considerable quantities of superphosphate are used to hasten the maturity of the crop, but it will probably be some time before this practice becomes at all common in the Canadian West.

The grower can rarely be governed by the calendar as to the time for planting corn. Heat and moisture conditions are more important than the date of the month.

The acreage of corn planted too early is generally greater than that put in too late. General experience leads one to the conclusion that, in the normal season, little is gained by planting before the fourth week in May, and in the backward seasons the end of the first week in June is as early as it is wise to put in the principal acreage of this crop.

The rate of planting differs widely. A bushel of twelve-rowed flint will contain more than twice the number of kernels that the same measure will hold of a large dent variety. If the seed, when tested, shows strong germinability, from nine to fifteen pounds per acre should be ample for hill planting, with an increase of from two to three pounds per acre for drill seeding.

Since the farmers of the prairie provinces are not interested in corn primarily for grain, and since a greater tonnage is usually secured from row planting than from hill planting, the probabilities are that the check-row-planter will not become general west of the Great Lakes for some time. Wherever the ridding of the land of weeds is one of the principal objects in growing corn the hill system is especially worthy of consideration, as it not only reduces the amount of hand labour but generally results in a better matured crop.

When corn, whether dent or flint, is planted in rows from thirty-six inches to forty-two inches wide, and when the stalks are thinned to different distances in the row, the heavily planted rows give more tonnage than the lighter ones but the quality is generally somewhat poorer. For example, stalks four inches in the row will yield more green feed per acre than stalks at eight, twelve or sixteen inches; but the best proportion of stalk, leaf and ear is generally obtained when the plants are left with from eight to twelve inches of space between them. Similarly, six stalks to the hill will yield more tonnage than four stalks, but the latter generally grades highest in quality. Small flint corns should be planted thirty-six inches apart each way; large dent varieties will do best at forty-two inches.

After the corn has been planted it should be harrowed two or three times before it attains a height of six inches. This will probably pull out some of the plants but if a tilting harrow is used the loss will be almost negligible. An occasional stroke of the harrow at this stage of the crop's development will tend to maintain a dust mulch, will conserve moisture, and, above all, will rid the field of myriads of small weeds which, at a later date, will otherwise become very troublesome.

When the harrow can no longer be advantageously used the two-horse cultivator should be started. The early cultivations should be wide and deep; the later ones should be narrow and shallow so as not to prune the roots too severely. When the corn has attained too great a height to admit of further use of the two-horse machine a single-horse walking scuffler of the strawberry type can often be used most advantageously, especially in very dry seasons.

When corn is grown for siloing it may be cut and fed as soon as it begins to tassel. When harvested for the silo the kernels should have reached the glazing stage; but if the crop is being grown for dry fodder it should be left standing as long as there is no danger of heavy frosts. The time of cutting, therefore, will be determined wholly by the use to which the crop is to be put.

Where any considerable acreage of corn is grown for feed a silo is a necessity, as only a limited acreage can profitably be grown either for siloing or for fodder. In some districts the practice of growing very early grain corns and "hogging off" the crop is becoming more general, but this is a practice in which corn growers in Canada have had too limited experience to warrant more than a passing reference.

The CHAIRMAN: Our difficulty I think in corn growing in our part of the West is the short season and the cold, or cool, nights.

Prof. FAIRFIELD: We have had irrigated corn on our farm every year except 1915 and also 1916 since the station was started, and that is overcome for this reason. In irrigating corn or any other crop we never irrigate it until the crop requires it.

We never apply water until the soil is dry enough and the crop really requires it, so that the irrigation of corn comes in the latter part of July and August when the ground is pretty hot and during the middle of the day the leaves draw up. Just the time the farmer would say, when looking at his corn crop, "My, if we could get a rain it would help," and that is the time we apply the moisture. We would not, however, irrigate the corn in June when the ground is not very warm.

The CHAIRMAN: I will now call upon Mr. E. H. Finlayson, Inspector of Forest Reserves, who will address us on "The Cypress Hills Forest Reserve."

Mr. FINLAYSON: The first definite action taken towards the establishment of a forest reserve in the Cypress Hills region was in 1906, when a small tract comprising eighteen square miles, lying west of the 4th Meridian, in Alberta, was set aside as a forest reservation. In 1911 the reserve was considerably extended some sixty-three square miles in Alberta and seventy-two square miles in Saskatchewan being added; this brought the total area in 1911 to 153 square miles. Subsequently, further examinations were made and in 1914 another twenty-five and one-half square miles were added, bringing the total area to 178·5 square miles—the area of the reserve at the present time. The Forest Reserve does not of course, include all of that territory which is familiarly known as the "Cypress Hills", but, as will be seen from the map, it is laid out in three separate blocks, including only such country as lies at the higher elevations and which is not well suited to the cultivation of farm crops.

The Reserve consists of a series of relatively high plateaus, these being deeply cut across in various directions by the numerous important streams which have their source in the hills. Between Medicine Hat and the summit of the hills some thirty-five miles southeast there is a difference in elevation of approximately 2,600 feet; in other words, the summit of the Cypress hills is higher above the city of Medicine Hat than the latter is above sea-level—some 400 feet higher. The difference in elevation between the town of Maple Creek and the summit of the hills to the south, however, is not so great, being some 1,700 or 1,800 feet.

Speaking of elevations it may possibly be of interest to some of you to hear that the average elevation of the hay benches in the Cypress hills is somewhat higher than the eastern boundary of the Rocky Mountains Forest Reserve. I think it is more than likely that most of those present have, at one time or another, travelled through the hills, and consequently it is unnecessary for me to describe them in detail; suffice it to say that as one travels southward from the main line of the Canadian Pacific railway the country rises very perceptibly till, on approaching the hills, somewhat rugged slopes are encountered. It is somewhat of a surprise on reaching the summit to look for miles in several directions over what appears to be almost dead-level hay-bench. To the south the hills slope away more gently. Rising in these hills are numerous streams of particular interest to those present. In the Western Block, Battle creek with its tributary Grayburn creek, Lodge creek, and Ross creek have their headwaters, some draining north but the bulk of the water draining south and east; the Centre Block gives rise to Belanger, Lone Pine, Sucker, Fish and Maple creeks; finally, in the Eastern Block there rise Davies, Fairwell, Sheep, Hay, Piapot and Bear creeks—the first two running southward eventually to reach the gulf of Mexico, the others draining north and having their eventual outlet Hudson's bay.

Formerly many parts of the Reserve bore a very fair stand of merchantable timber, but unfortunately the very extensive fire of 1886 practically wiped out the bulk of this timber in some areas, while in other places fires of subsequent date destroyed the balance of the original stand of merchantable timber. In speaking of "merchantable timber," I refer, of course, to timber of sufficient size for saw-mill purposes. To-day there remain only a few isolated patches of large timber, practically all in the

Western Block. It is true that a fair-sized block of timber to the south of Elkwater lake escaped the fire of 1886; this, however, was included in a timber berth and not only was the bulk of it removed by logging operations, but the logging slash which resulted therefrom constitutes about the worst fire menace which we have anywhere in the reserve. It was a most fortunate circumstance that one of the constituents of the original stand of timber, namely, lodgepole pine, has rather a marvellous capacity for reproducing itself; this is due to the fact that the species is a prolific seeder, and that the seed-bearing cones are so hard and compact that oftentimes it takes almost the heat of a fire to break them open so that the seed may be shed. To these characteristics of the species is due the fact that over very extensive areas we have a remarkably good reproduction of lodgepole pine. The tree itself, however, is exceedingly susceptible to fire, the bark being comparatively thin and scaly, and it, as well as other portions of the tree, is decidedly resinous and inflammable. Notwithstanding its reproductive qualities, therefore, with repeated fires the species may soon be practically exterminated; that is, if fire destroys the pine stand in its younger stages, before the trees are capable of bearing seed, we can hardly expect the species to maintain itself. Lodgepole pine, it may be said, is almost distinctively a mountain tree, and so far as we know the Cypress hills is the only place where it ventures so far eastward.

White spruce also was an important constituent of the original stand, occupying the moisture situations, and consequently escaping the fire in rather isolated patches; in some places it is reproducing itself in a rather limited extent. The only other important kinds of timber to be found are the poplar (two species) and the willow (several species); a small amount of birch is to be found in some parts, and, though I have not seen it, one of our officers has reported a limited amount of wild cherry, Manitoba maple and kindred species in the eastern part of the reserve.

As to distribution of timber in the reserve, the Western Block is approximately 70 per cent timbered, of which perhaps the bulk is pine and spruce, the balance poplar and willow. The Centre Block is approximately 40 per cent timbered, about one-half pine and spruce, one-third poplar, and the balance willow; the main body of timber in this block is about 30 years old and has an average diameter, breast high, of from 6 to 7 inches. The Eastern Block is approximately 75 per cent timbered, but there is but little pine or spruce; poplar, willow and other species having taken predominance, probably as a result of repeated fires in the early days. That such a large area of the reserve (about one-third) is entirely devoid of tree growth can not be solely and legitimately attributed to fires, at least not to fires of recent times. There are many areas, notably the hay benches, where we have no conclusive evidence that timber growth has existed in modern times. That at least certain portions of the hay benches are capable of bearing tree growth, however, is evidenced by the presence in isolated patches, or as individuals, of small stunted pine growth, in spite of the remarkable growth of grasses which are inimical to tree growth.

The whole reserve is in charge of a forest supervisor, Mr. F. D. Brown. He has a permanent staff of three forest rangers and one general utility man. The Western Block is divided into two ranger districts, the ranger in charge of the westerly district having his headquarters three miles south of Elkwater lake, while the second ranger has his station on Battle creek near the reserve headquarters. The third ranger district embraces the Centre and Eastern blocks of the reserve, the ranger having his headquarters in the northern part of the Eastern block on Birch creek.

The general headquarters of the Reserve is located on Battle creek close to the point where it crosses the southern boundary of the Reserve. At this place the supervisor has his residence and office. Under the direction of the supervisor the rangers perform the function of fire patrol and protection. They conduct the timber and hay administration and all other duties which arise in their respective districts. To facilitate the administration material improvements are rapidly being provided. In the time during which the Reserve has been under definite supervision, almost exactly

three years, there have been constructed a supervisor's house and office, three ranger houses, four fine barns, two outlying ranger cabins and stables, twenty miles of telephone line, considerable road improvements, and many miles of fire guard and boundary lines and other improvements. Such items, however, are merely preliminaries to the proper development of the Reserve. Much work lies ahead which may be of more direct benefit to the water users of the Cypress Hills region. I think every one will grant, however, that facilities must first be provided wherewith to solve the problems of fire protection, ere it is feasible and safe to initiate work of a more technical character, namely, the improvement and re-establishment of the forest cover.

The two primary factors entering into the establishment of the Reserve were, (1) the maintenance of timber supply, and (2) protection of the watershed. With the latter of these I presume you are particularly interested, but let me first say something with regard to timber utilization. With the exception of the Cypress hills practically the entire country for many miles in every direction is almost or entirely devoid of tree growth. Very fortunately there are extensive areas of lignite coal and, as a general proposition, the fuel situation is not so serious as would otherwise be the case; nevertheless there are many who still must depend to a certain extent on wood for fuel purposes. Even in the production of coal, wood is necessary. For other purposes, also, such as lumber, fence posts and rails, poles, ties and rough construction timber, the forest must still continue to supply the wants of man. Notwithstanding the development of many substitutes for wood, statistics do not show that the per capita consumption of wood has materially decreased; indeed, in many parts it has appreciably increased. As this state of affairs will probably continue for many many years, it is essential that we should consider carefully the question of our supply. Taking the area of the Cypress hills which at present is under forest cover of one kind or another, and without even attempting to re-stock the open areas, using the most conservative figures the Cypress hills is capable under proper forest management of producing from six to seven million feet board measure per year; at average rates of consumption this is sufficient to supply the annual requirements of some 18.000 people. At the present time the Reserve is supplying a certain local demand for various classes of wood products, but to bring it to a state where it will take its proper place in supplying demand will take years of painstaking effort and intensive application of the principles of forestry. If we could have the Cypress hills as they probably were forty or fifty years ago, it might only be necessary to put in effect a well regulated system of cutting. Taking it as it stands to-day it is necessary that we confine cutting operations to such classes of timber as may well be spared without detriment to the forest cover; to securing as complete utilization as possible of all dead and inferior material now present; to formulating and putting into effect plans for re-stocking by artificial means such areas for which we cannot depend on natural regeneration. Situated as it is, in the heart of a country practically devoid of tree growth; offering as it does, the most advantageous conditions for forest practice; and important as the maintenance of the forest is with relation to the watershed, the Cypress hills offer the most unique and favourable set of conditions for scientific forest practice in the prairie provinces at least, if not, in the whole Dominion of Canada.

Coming now to the protection of the watershed, it is generally recognized that forests offer very decided influences to both local and general climatic conditions. It cannot be claimed that a small forest can exert any decided influence over climatic conditions of a large area, notwithstanding the fact that it does have a decided influence upon climate within the forest itself; rather it is claimed that if the proportion of forested areas in a country is in proper relation to the area of the whole, the effect of the forest on climate is generally and favourably appreciated. The effects of forests on climate may be summarized as follows:—

(*a*) The forest lowers the temperature of the air inside and above it. The vertical influence of forests upon temperature extends in same cases to a height of 5,000 feet.

(*b*) The forest lowers the temperature of the soil in summer and increases the temperature of the soil in winter. This influence extends to a depth of at least four feet.

(*c*) The relative humidity of the air during the summer is higher in the forest than in the open.

(*d*) Forests increase both the abundance and frequency of local precipitation over the areas they occupy, the excess of precipitation as compared with that of adjoining unforested areas amounting in some cases to more than twenty-five per cent. This is due to the tendency of moisture-bearing currents to precipitate their moisture more readily above or near the forests than over bare or cultivated fields at the same elevation because of the dampening and chilling effect of the forests upon the atmosphere, which induces a greater condensation of the water vapour. Also, the air from forests contains a much larger amount of moisture than that over bare or cultivated fields. These effects on local precipitation are more evident in very hilly or mountainous country.

(*e*) The presence of forest cover decreases to a very marked extent the evaporation from the earth's surface, due not only to interception of the sun's rays, but to the greater humidity of the forest.

Inasmuch as the area of the Cypress Hills Reserve is very small as compared with the extensive open areas surrounding the hills I do not pretend to claim that restoration of the forest cover to normal is going to have any decisive or general effect on the climate of the surrounding country. Its local effect, however, even if confined to the reserve area itself, is of importance in connection with the regulation of stream flow. In hilly and mountainous country the forests are conservers of water for stream-flow. Even on the steeper slopes they create conditions with regard to surface run-off such as obtain in a level country. Irrespective of species, they save a greater amount of precipitation for stream-flow than does any other vegetable cover similarly situated. They increase underground seepage of water to a larger extent than does any other vegetable cover. The steeper the slope, the less permeable the soil, and the heavier the precipitation the greater its effect. The forests break the violence of rain, retard the melting of snow, increase the absorptive capacity of the soil cover, prevent erosion, and check surface run-off in general, thus increasing the underground seepage and so tending to maintain a steady flow of water in streams.

In the hills and mountains the greatest source of loss of precipitation is through surface run-off, and the most important influence which a forest cover has is in reducing this. In general it may be stated that the amount of water which the forest cover saves to the soil by reducing the surface run-off and changing it to underground seepage is as follows: For forests at low altitudes where the rains are not heavy and the soil is less subject to freezing, twenty per cent; for forests of moderate altitudes, thirty-five per cent, and for mountain forests fifty per cent of the precipitation. The saving of precipitation effected in this way by the forest is more than sufficient to offset whatever loss may be sustained through transpiration or interception by tree crowns. This is clearly brought out by the following facts: The entire loss of water from forested areas at moderate altitudes, even on the steepest slopes, is about equal to that from forest in level country. Ney places this at sixty-one and one-half per cent of the precipitation. Cultivated fields on similar slopes have been computed to lose, through interception by vegetable cover, evaporation from the soil, transpiration, and surface run-off, seventy-nine per cent of the precipitation, and bare surfaces eighty-six and two-fifths per cent. The higher the altitude, the steeper the slope, the heavier the rainfall, and the greater the precipitation, the more marked will be the difference.

That a normal forest in the mountains saves more water for stream-flow than any other vegetable cover or any bare surface is shown also by the abundance of springs in mountain forests. Reduction of surface run-off means both an increase of under-

ground seepage and prevention of erosion, two important factors in the regulation of stream-flow. The action of mountain forests in protecting the soil against erosion and in increasing underground seepage at the expense of surface run-off is the result of their ability to lessen the severity of rainfall, to retard the melting of snow, to offer mechanical obstacles to surface run-off, to hold the soil together, to keep it in a permeable state, to increase its volume by constantly adding new soil, and to absorb large quantities of water by its leaf litter.

In glancing over the report of one of your previous conventions the other day, I noticed resolutions passed by the Cypress Hills water users urging the formulation of plans for establishing artificial reservoirs in order that the water supply might be conserved and regulated. These may undoubtedly be necessary, but I would also point out that the evaporation from a free water surface outside a forest is greater than from a free water surface within a forest; also, the forest itself, aside from the natural bodies of open water which it may enclose, acts as a great reservoir, regulating stream-flow and preventing erosion and floods, which, entirely aside from the water loss they involve, have a mechanical effect in causing destruction not only to ordinary lands and property, but also in some cases to the very works designed to conserve and use the water. If, as a result of the few explanations I have given of our work from a forestry standpoint, and the few general remarks with regard to relation of that work to your interests, you can induce governments and the people to see the necessity of maintaining and improving the forest conditions in the Cypress hills, I can only say that if our interests are not precisely mutual, they are at least very closely allied, and both from the standpoint of timber supply and water supply every one will benefit greatly by measures which may be taken as a result of our endeavours. Just as we who are in forestry work may say "fire is our great enemy," you who are engaged in irrigation work may say "floods are our enemy." Reducing fire danger improves the forest and does at least something to reduce floods; conversely, reducing floods, that is surface run-off, does much to reduce fire danger. Therefore, let us each pursue our own ends and we cannot do otherwise than help each other. (Applause.)

The CHAIRMAN: I am sure that you have appreciated the paper to which you have just listened, because the recent fires in Alberta bring home to us the fact that we should take more interest in reforestation.

Mr. MARNOCH: Mr. Finlayson establishes a connection between this forest reserve and irrigation. It affects the people of the Cypress hills more than it does the people in Alberta, but generally speaking Mr. Finlayson puts his statement this way: that the Cypress Hills forest reserve is a sponge, if only used properly. We are told that there are 475 water users in that district, and Mr. Finlayson states that if the matter of reforestation is attended to, the matter of water will be greatly improved. I think a motion should be made by this association to the Dominion Government. The other matter of the output of some six to seven million feet of lumber is of great interest. When you get in addition to that a new and valuable asset which will have the effect of increasing the effectiveness of that sponge, I think that this association should do something in the way of a resolution to the Dominion Government asking them to do something in the way of reforestation.

THURSDAY EVENING SESSION—AUGUST 2.

The CHAIRMAN: I would ask Mr. G. R. Marnoch, President of the Board of Trade, Lethbridge, to speak on "More and Better Water for our Farms."

Mr. MARNOCH: May be this subject is not a matter of prime importance to irrigation farmers, because the water that is brought to the farm by the canals is all right for stock purposes, and if it can be stored in cisterns and filtered and purified for domestic use, and if the irrigation farmer has a preference for getting his domestic water by means of a well, so that the supply is already filtered by percolation from the canals and through the soil, he usually has no difficulty in getting such well water at easy depths; so the irrigation farmer is comfortable in this respect. But there are very few farmers through southern Alberta and southern Saskatchewan who would not feel very much easier in their minds, and their bodies too, if they had more water for house and farm use; and there are very large numbers of farmers and people in towns and villages who would be very happy indeed if they could get any well water.

When we first started in Lethbridge in 1914 to look into this matter on behalf of some of our farmer neighbours, the so-calleld oil boom was on in Alberta. In looking over some of the valuable publications of the United States Geological Survey on this subject we came across the information that the government geologists in the States made it a regular part of their business to prospect for water supplies. Up till that time, however, nothing had been done in that direction in Western Canada. We seemed to prefer to use the hit or miss method, or at best to trust ourselves to the tender mercies of the water witch or the divining machines. The folks who attended the Water Conference in Lethbridge on the 22nd of June this year did not take very long to make up their minds that some surer methods than these should be followed if we were to make much progress. Upon information that we had received from the United States Geological Survey and other sources, we had come to that conclusion long before; at any rate, we thought we ought to call for help from our own government geologists. That was readily given as soon as it was asked for, and in the summer of 1915 Mr. D. B. Dowling and Mr. Slipper spent several months in surveying the rock and shale exposures, and examining the logs of such deep wells as were available in the districts south and east of Lethbridge. They came in at the end of the season with the valuable information that some three to five hundred square miles of that territory was underlaid by a sandstone carrying water seepage from the Milk river in the south and that it could likely be got by boring to six to eight hundred feet depths, which would bring in flowing wells. The next thing, however, was that as far as our knowledge went it would cost four or five thousand dollars to get a six-inch well down that far, and as no farmer would even think of such an expenditure unless we were as nearly as possible certain that he would get the water, we thought the Dominion Government should do something to confirm the valuable information that the geologists had produced. We, therefore, asked the Government to help out. In due and decent course of time it was arranged that one or two test holes should be put down in public road allowances in parts of the district where such wells had not previously been drilled. One of these, about ten miles north of Legen, on the Lethbridge-Manyberries line, has been successfully completed, and it has a flow of 4,000 gallons a day from a depth of 633 feet. With the artesian wells that had been previously sunk at Etzikom, Coulee, Foremost, Grassy Lake, Taber, and Neidpath, the field has now been fairly well proven. The Canadian Pacific Railway is drilling another artesian well at Conrad, and the Government will go on with two more wells, and the results of these borings will add further to our knowledge.

All of this, however, leaves a big problem still unsolved, namely, is there any possible way of getting down to the artesian water with a smaller hole which would give a good supply for the average farm at a smaller outlay than four or five thousand dollars; what means can be taken to get water supplies at lower depths, and especially in the regions outside of the artesian area; what can be done by diverting waters from streams, and how best can water be saved in coulees and depressions; can any cheap means be found for prospecting for water by a quick method of drilling small holes to look under the ground, as it were, for water, before going to the expense of digging or drilling; and last, but not least, are we doing our best to take care of the rain water that falls on the roofs of our buildings.

To see what daylight was available on all these important questions we decided to summon a conference at Lethbridge a few weeks ago. The farmers came in in large numbers, and the great need that they are in was amply shown by one man, who said he would gladly mortgage his homestead to any one who would find water on it. He had spent hundreds of dollars in drilling dry holes. He, and many others equally anxious for water supplies, were able to confer with the government geologists, the irrigation engineers, and health officers, and the railroad engineers, who have big problems themselves in quenching the burning thirst of their big locomotives. Every one threw his knowledge and experience into the common pot. A vice-president of the United Farmers of Alberta and one of their directors were present. The Deputy Ministers of Agriculture and of Public Works for the province of Alberta were there too. The finest spirit of co-operation was in evidence throughout the meeting. The geologists and engineers were quite delighted to meet the farmers and to put the whole of their knowledge and experience at their disposal.

Some useful knowledge was contributed by one or two of the farmers, who said they had been able to trace out limited supplies of surface water by certain plant growths. This is being looked into now by some of the government officials.

In the later stages of the conference there was some discussion as to the need for more extended attention to the subject of education in rural engineering. This subject affects all classes of farmers, and it would be well if our farm boys could get useful direction in elementary engineering work, such as the principles of good road-making, building dams, and laying out irrigation canals and drainage ditches.

We also heard from Mr. F. H. Peters, who has been making practical tests of a water still that he has designed for use on farms. Dr. Seymour, Commissioner of Public Health, Saskatchewan, addressed the conference on the saving of rain water, filtering water, and generally on plumbing and sanitation for the farm home.

We are proceeding now with the gathering together and printing of as much as possible of the information brought out at the conference, and we hope to have a little booklet on the subject ready in course of a week or two.

Here are the resolutions that were passed. They give in concise form the results of the discussion:—

> "That this conference respectfully requests that full inquiry be made by the Department of the Interior of the Dominion of Canada into the important question of reservations along the rivers, lakes and coulee fronts for sanctuary for live stock in time of drought in the drier areas in southern Alberta and southern Saskatchewan, with a view to making such reservations.
>
> "Further that, following upon and during this inquiry the Alberta and Saskatchewan Provincial Governments collaborate with the Dominion to the end that practicable road approaches may be provided for reaching those reserves; and further that, the Government take steps to reserve a strip along all water fronts."
>
> "Resolved, that this conference respectfully requests the Dominion Government Department of the Interior, to make inquiry with a view to supplying a living stream of water from Milk river via the Alberta Railway and Irrigation canals, via Stirling and Etzikom coulees and Pakowki lake, with a view to

constructing such works as may be necessary to supply such water for the increasing needs of the farming communities of southern Alberta.

That in the opinion of this conference there should be established at the University of Alberta a department of agricultural engineering to give the B.S.A. graduates and others interested a course in this work, and to undertake such research work as shall be of service to the farmers of Alberta in matters pertaining to roadmaking, irrigation and drainage."

"In view of the information given at this conference that the Irrigation Branch of the Department of the Interior have a Calyx boring machine which could be used for rapidly and cheaply drilling test holes for the discovery of water. Resolved that this conference respectfully requests the Alberta Government to secure the use of this machine for discovery tests, first, in the area south of Coalhurst and west of Lethbridge, and if it is found satisfactory in practice for this purpose, that the Alberta Government purchase several of these machines for use in testing for water in depths up to 100 feet.

"Resolved that this conference urges on both the Dominion and Provincial Governments the desirability of obtaining a full and complete log of all wells dug or drilled whether for water, gas or oil in Canada. That such information is absolutely necessary having in view location of further wells;

"That analysis of water so obtained in such wells be recorded for purposes of ascertaining if such be potable or suitable for stock watering purposes;

"That if in order to obtain such laws legislation be necessary, that the same be passed; also that regulations be passed to prevent waste of waters from flowing water wells and gas and oil wells."

We are receiving inquiries every day from farmers as to what practical results have come from the water conference. Well, as soon as the conference was over, copies of the resolutions were sent on to the Minister of the Interior at Ottawa, and to the Minister of Public Works and the Minister of Agriculture at Edmonton.

There can be no doubt that the closest co-operation will be extended by the Department of the Interior. Hon. Dr. Roche writes that, "the matters referring to the Interior Department will be given every consideration, as we desire to do what we can to meet the wishes of our settlers in every reasonable manner consistent with economy during war time."

Hon. Chas. Stewart writes from Edmonton:—

"Anything that we can do to open up road allowances to water reservations will be cheerfully done by us." A formal acknowledgment of receipt of the resolutions has also been received from the Public Works Department at Edmonton.

One of the things that is being taken up at once is the getting into use of the small boring machine for testing out for surface waters over south of Coalhurst and Kipp. We wired to Hon. Chas. Stewart: "Referring to resolution of water conference, farmers are anxious to learn what is being done to secure the small boring machine from the Irrigation Branch at Calgary and set it to work prospecting. Should be no difficulty getting machine. Minister of Interior writes indicating fullest co-operation." And we learn from Mr. Charlesworth, the Deputy Minister, that he is in communication with the Commissioner of Irrigation on this matter.

With regard to the watering reservations for live stock, it will likely take some time to have this thoroughly looked into; but there are many cases now where farmers are blocked from easy access to river waters. Such farmers can now take these matters up direct with the Public Works Department, on Hon. Mr. Stewart's assurance that road allowances to water will be opened. Farmers can do this individually or through their local organizations.

We are advised that Hon. Dr. Roche is giving his personal attention to the important subject of stock watering reservations.

Owing to his duties on the Grain Control Board, Mr. H. W. Wood, President of the United Farmers of Alberta, was unable to attend the conference, but the Board of Directors of the United Farmers of Alberta have placed their official seal of approval on the actions of the conference by the following resolution:—

"Resolved:—

"1. That we endorse the action of the Lethbridge Board of Trade in calling the Water Conference recently held in that city.

"2. That we believe the questions there considered are of vital interest to the farmers generally.

"3. That we are in harmony with the general principle of the resolutions there passed.

"4. That we favour the publication and distribution of the proceedings of the conference at Government expense."

While it is necessary to lean back on the governments on some of these matters, it is just as well to confess that many farm buildings are not provided with eave-troughs, barrels and cisterns. This neglect is criminal. The weather clerk lays the water on the roof, and if you only give him a little bit of pipe he will put the finest, softest rain water right into the barrel or down in the cistern for you. A farmer's wife says to me the other day, "Yes, *he* has been talking of putting up eave-troughs and setting up a barrel or making a cistern for the last four or five years," and the way she said it seemed to indicate that if she waited four or five years longer *he* might get round to it. In one of the new towns along the Manyberries line only two buildings out of about two hundred have eavetroughs, yet the people pay sixty cents a barrel for water from a slough. I find it necessary to mention such things as this to farmers who complain about the painfully slow actions of the governments. I almost think the water conference should have passed a resolution requiring every farmer to do what his wife told him to do in regard to getting domestic water, and to do it at once; only even at that I have discovered that resolutions need to be followed up, and if the farmer's wife cannot do that, it is hard to know who could do it better. I mentioned this matter the other day at a gathering of farmers and their families who had come to spend the day at the Dominion Experimental Farm to imbibe some of Mr. W. H. Fairfield's wisdom about irrigation farming and dry farming. Some one had been talking to them about planting trees, and I told them that many promises had been made to plant trees around our country schoolhouses and it was necessary to remark that trees grew better on summer-fallow land than on promises. A farmer's wife came up to me afterwards and said, "You should not be discouraged about the trees, and the women should not be impatient about the rain water. I got eavetroughs and a cistern this year after fifteen years' agitation."

Away back in 1914 at a meeting in Regina we discussed water for the farms for a while. I quoted the verse from an Old Country song:—

"A little farm well tilled
A little house well filled
A little wife well willed,
Give me, give me."

and our friend Dr. Rutherford improved on these poetic lines by adding another,—

"A little well well drilled."

So while it has taken us three years of patient endeavour to get even this far on the question of more and better water for the farmer, we may take heart of grace from the experience of this farmer's wife, and we will keep on investigating, resolving, boring, drilling, digging and damming till every farmer gets all the water he wants for his beloved live stock, and until every farmer's wife gets at least enough water for the weekly wash delivered inside the house at the kitchen tap.

During the water conference I read this quotation from a little booklet called "Farm Efficiency" which contains about as much common-sense in small bulk as I have ever seen. The booklet is by Xenophon Caverne of the Kewanee Public Utilities Company, of Kewanee, Illinois. "President Joe Cook, of the Mississippi Normal College, in a bulletin of the United States Bureau of Education, makes the rather startling statement that the average farmer's wife has to lift a ton of water a day. Here is how he figures it out:—

The getting of the water from the source of supply to the point of application requires more manual labour than any other item of housekeeping. The water for the kitchen has to be lifted from the well, carried to the kitchen, poured into a kettle; poured out of the kettle into the dishpan, and from the dishpan out of doors. This makes six times the water is handled, and a bucket of water containing two gallons, with the containing vessel, will weigh twenty pounds. When this is handled six times the total lifting is 120 pounds. The cooking of three meals a day on a meagre allowance of water will necessitate ten buckets, which will make for cooking alone, 1,200 pounds of lifting per day. When to this is added the water necessary for bathing, scrubbing and the weekly wash, it will easily bring the lift per day up to a ton; and the lifting of a ton a day will take the elasticity out of a woman's step, the bloom out of her cheek, and the enjoyment from her soul."

Imagine an average farm home without modern improvements and conveniences. Picture to yourself an average farmer's wife as she goes through her daily routine. Follow every step from the time she starts the fire in the frigid kitchen till she lays wearily down the last pair of mended stockings at night. Now by magic, transfer her in her sleep into a house with just the plain conveniences; a heating system; running water; hot and cold; a bathroom with lavatory, closet and bath tub; a sanitary system of sewage disposal; a power plant that not only pumps the water, but runs an electric light plant with storage batteries; a power washing machine and wringer, a power separator and churn, a vacuum cleaner, and perhaps an electric flatiron and a little motor to run the sewing machine.

Give her an extra hour to sleep. The kitchen is warm, the water is hot, and she can get breakfast in a jiffy on the oil stove. Now picture to yourself her day's work and her day's uplift to body, mind and soul. It is the difference between losing and winning, between conquering and being conquered. Look at these pictures from the standpoint of efficiency, of humanity and of romance. No magic of Aladdin's lamp could work a greater transformation or bring greater joy and comfort.

And what would be the cost? The wages of a hired girl or two weeks of a nurse and doctor would much more than carry the interest on the investment; so would the price of a fair cow or a poor horse. A long spell of sickness and a first-class funeral would buy the whole plant." (Applause.)

CHAIRMAN: I do not think Mr. Marnoch needs to say anything about the timeliness of his paper. There are hundreds of farmers around the country trying to do something to relieve the drudgery of the household tasks. We often speak of the weak link in the agricultural chain as being farm power but the weak link is in most cases the water.

I have come from a brief visit to Banff. I think it was occasioned by too hard work and neglect of myself in my earlier days. I found that the hotels there are filled with wornout farmers and their wives from the Prairie Provinces. Instead of laying up early for repairs, they go on for forty or fifty years before they do lay up. We would not use our binder or threshing machine that way. Every man repairs his machine about this time in order that his threshing machine will not break down during threshing. We should do the same with ourselves. After all, human life is more valuable than anything else on the farm. The most expensive and extravagant way of doing your farm work is at the expense of your wife's health. There is scarcely a place that

I know of in these western provinces where something cannot be done to help out in the matter of water supply. Of course, the man who is without eavetroughs on his own farm buildings should not shout for help from the Government until he does have them. If you just sit down without water and wait for the Government to come along with it, the Government will not be in much of a hurry to do anything.

Mr. DIXON: Why do they bore such a large hole?

Mr. MARNOCH: The point is to dig to find out if water is there. If he wants an ample supply and if he wants to get a reasonable quantity he must start out with a bigger hole to get down to a big depth.

Mr. DIXON: At Medicine Hat we use a much smaller hole in boring for gas and we go 800 feet.

Mr. PEARCE: That is because you know the strata.

Mr. POTTER: I would suggest that the resolution adopted at the Lethbridge Conference be adopted by this association.

The CHAIRMAN: It is the wish of the convention to hand those resolutions to the Resolution Committee.

The CHAIRMAN: I will now call upon Mr. A. S. Dawson, Chief Engineer, Department of Natural Resources, Canadian Pacific Railway, to make a report upon his visit to the International Irrigation Congress held at El Paso last October.

Mr. DAWSON: The International Irrigation Congress was held in El Paso, Texas, on October 14 to 19 last. I attended it in company with Mr. R. J. C. Stead, your acting secretary; Mr. R. S. Stockton, of the Department of Natural Resources, Canadian Pacific Railway; and Mr. S. G. Porter, of the Irrigation Branch of the Department of the Interior, Calgary, as delegates representing this organization, the city of Calgary, the Canadian Pacific Railway Company, and the Canadian Society of Civil Engineers. We were given a hearty welcome and placed on the programme. Lt.-Col. Dennis, one of the prime movers in this association, was again chosen first vice-president, and I was elected on the Board of Control.

The congress was a success in every way, and was attended by over 400 accredited delegates. It was not as large in point of numbers as in some previous years, owing principally to the long journey in reaching El Paso, which as most of you know, is on the Mexican boundary.

However, this gave an opportunity to the delegates to see conditions different from those obtaining in any other part of America.

After the sessions were over at El Paso, the congress adjourned to attend the function of the opening ceremonies in connection with the Elephant Butte dam, recently built by the United States Reclamation Service, near Engle, New Mexico.

Although there are not many engineers present here, it will be of interest to you to know a few facts regarding this great structure. It is the third highest dam in the world, with a maximum height of 306 feet and a length of 1,311 feet. In construction it consists of Cyclopean concrete, with the up-and-down stream faces cast against forms. It contains 605,200 cubic yards of masonry and creates the second largest artificial reservoir in the world, with a capacity of 2,640,000 acre-feet. The structure is indeed a monument to the engineers of the United States Reclamation Service.

The International Irrigation Congress, as you know, has grown to be a large organization, costing from $7,000 to $10,000 a year to carry on. It was expected to have held the sessions this year at Ogden, Utah, but existing conditions forced the governing body to postpone it for 1917 at least.

I think you will agree with me that it is most desirable to have close affiliation between our association and the larger and older similar association in the United States. The same problems are being worked out in both countries, in efforts to make better farms and better farmers as well as improved living and social conditions, and both are engaged in the same great problems of colonization, home building, and the development of agriculture along the best possible lines.

Most great movements have been started in a small way, and this applies to the Western Canada Irrigation Association. This association, as you are aware, was created by a small group of energetic men in Calgary in 1907, and I think we should feel satisfied with our growth.

In 1912 we had 165 accredited delegates at Kelowna.

In 1913 we had 132 accredited delegates at Lethbridge.

In 1914 we had 176 accredited delegates at Penticton.

In 1915 we had 200 accredited delegates at Bassano.

In 1916 we had 150 accredited delegates at Kamloops.

This year we have 158 accredited delegates at Maple Creek.

I would urge you all to be optimistic and enthusiastic about the future; realizing that there is strength in numbers; and that it is each one's duty to do the very best for the association, not for personal reasons, but for the good of a cause that is playing a more and more important part in the development of very large sections of Western Canada. (Applause.)

The CHAIRMAN: As you will note from Mr. Dawson's report, the International Irrigation Congress was held at El Paso; the same place where the last dry farming congress was held. Now, I think that is very proper because those two congresses should run together. It has been suggested that for efficiency and economy the executives of the irrigation and dry farming congresses should come together. I have come to see that during the past thirty years I have been more or less of an irrigator in my farm operations. Any man who endeavours to hold the run-off on his field is an irrigator. The man who draws brush into his field or garden in winter or the late fall in order to hold the snow is an irrigator. I think the idea of merging these two congresses into one is a very good one.

I have been waited upon by a deputation representing the association asking if I would pledge the Government of Saskatchewan to continue the grant annually. In so far as it is possible for one member of a government to pledge his government, I will pledge myself to do all I can to continue the grant given by the province of Saskatchewan to further the work of the Western Canada Irrigation Association.

If legislation is required in connection with the building and allocation of the cost of reservoirs for irrigation districts in the province, I will be only too pleased to get in touch with the executive officers in Saskatchewan to draft the proper legislation just as soon as conditions warrant it.

We know pretty well now without even consulting the newspapers what the harvest is going to be this year. There is no use regretting the drought. The very fact that we are irrigators shows that we anticipated it. The crops of 1914 and 1915 were so large that they were enough to make two or three crops in this country. We must, however, always be prepared for drought. A great many people, when they get a few wet years, forget that there may be such things as dry years. I believe in preparing for the worst and hoping for the best.

I regret very much that the last two years have been just what some of us feared, and the farmers neglected their tillage. There is absolutely no use in depending upon cloud moisture. It is no wonder that people in the old days claimed that this was an arid district. If you attempt to farm and crop every year off the same field you will assuredly fail. If you adopt irrigation or dry farming methods you could beat out any drought that has come into this district during the past half century.

Those of us who are here know the effect of the drought. We know that in 1914 after that dry year the farmers just buckled on their armour and used the little oats they had to feed their horses and got a lot of ploughing done, with the result that the next year gave us the most phenomenal crop yield we ever had. We know now that the crop will be light and that a large amount of harvest labour will not be required. But to you who can afford it I would say, do not skimp on your harvest labour, use it to get your land into such shape that the crop next year may be greatly improved. During the last two years big crops and good prices have lessened the strain on behalf of the individual more than it has on the collective whole which includes our Allies at the front.

The very fact that you are assembled here to-day for a main purpose should enlist the services of every patriotic man in the country. I have seldom if ever exceeded the enjoyment I have received from this meeting. One thing that has given me great pleasure at this convention is the absolute lack of friction exhibited between the federal and provincial officers of their respective governments who have so well attended this convention.

I remember the first time I went to the Dry Farming Congress at Billings and succeeding congresses; they would not be open ten minutes before you would note every federal or state official. They were waiting to get in a lick at the other fellow and those of us who came from the other provinces thought a lot of time was wasted in bickering about their respective official duties. I defy any one to find or distinguish between a federal or provincial officer at this convention. Now, I believe Mr. Finlayson desires to say a few words.

Mr. FINLAYSON: This morning I was speaking about the Cypress Hills Forest Reserve. I mentioned the question of fire protection which has been given some attention. Now I thought I would say something about this subject inasmuch as forestry work is closely allied with irrigation and it may not be out of place to say a few words now with regard to that. The Forestry Branch of the Department of the Interior is doing much to bring the Forestry Branch before the people of Canada. They are advertising in different ways to bring before the people the importance of this branch. I have some blotting paper with me which is really the first article manufactured from Forestry Branch products, and I have also some whetstones that will be handed out to-night to the delegates. If you have not any intention of going into the forest yourself perhaps you may have a boy or girl who is going into the woods, and just as you press upon them that there are ten commandments to be obeyed, you should impress upon them one which Moses probably omitted and that is, do not allow fire in the forest.

The CHAIRMAN: On the representations of the Dominion Forestry Association, the Provincial Government of Saskatchewan passed a new Prairie and Bush Fire Ordinance which was greatly along the lines of the Forestry Association ideas and met with their approval.

I have been asked to suggest as a nominating committee which will make nominations for the new executive, Messrs. John Dixon, William Pearce, J. L. Brown.

Mr. PEARCE: I desire to move a hearty vote of thanks for the very able and efficient manner in which our chairman, the Honourable Minister of Agriculture, has carried on the duties of chairman of this association's convention in the past few days. I think it comes from me with particular good grace to make the motion from the fact that I am the first man from the two provinces of Saskatchewan and Alberta that has directed attention to irrigation. I also think that dry farming should be known more largely as a method of more cultivation. Dry farming to my mind, however, is more than mere cultivation. The time will come in this country when we shall want to conserve every drop of water that is possible for the production of cereals and grasses. I quite agree with the chairman that a union of the two bodies of dry

farmers and irrigationists would be an advantage to both. I have very much pleasure in moving a hearty vote of thanks to the chairman of this convention.

The motion was carried with loud applause.

The CHAIRMAN: I wish to thank you very cordially for this manifestation of my services. I am only sorry that I am not able to stay until the convention is over. You must all have felt the splendid spirit of co-operation that has prevailed throughout the discussions of this convention.

FRIDAY MORNING SESSION, AUGUST 3.

Mr. G. R. MARNOCH, Chairman.

The CHAIRMAN: I will call upon Mr. A. Mitchell, who operates the nurseries at Coaldale, Alberta, to address us.

Mr. MITCHELL: The subject that has been allotted to me, "Fruit Raising on the Prairie," would to some people from real fruit countries, seem like wasted time. To think that we could ever raise fruit on the prairie with the short growing season and the rigorous winters that we have would appear to them as preposterous. I hope, however, to be able to show you that something has already been accomplished in this direction and I will endeavour also to point out the lines along which further effort should be made. This question of fruit raising on the prairie reminds me of a gentleman I met in Calgary about fifteen years ago. He came from Ottawa and he had recently been at Maple Creek, and he told me that one of the party he was with made the prophesy that Maple Creek would yet be canning peaches. Now I have been around Maple Creek the last two days looking for the peach factory, but I was unable to locate it. Mind you, I am not saying it is not going to be here. I do not know what kind of a reputation that prophet had in his own country. It may be he was just carried away for the moment by an exuberance of real estate enthusiasm, but I would be loathe to think he was not a good prophet. We never know what this West is going to produce and I think there is just a possibility that we may yet be canning peaches or apricots at Maple Creek. I have seen peaches tried at Taber. That is I saw the tree planted, but it did not live over winter.

In this country we have several disadvantages operating against success in fruit growing that are not met with in more favoured climates. We have heat and cold and drought and altitude and Chinooks, and last, and worst, we have a very short growing season. These make an awfully hard combination when you think of growing fruit, and yet a great deal has already been done to meet these untoward conditions and produce fruit on the prairie.

There are two things essential in fruit growing, anywhere.

The first is, trees that will be hardy and live over from year to year; and the next is, trees that will fruit after they do live. In fruit growing, as in all crops on the prairie, the great thing is to get a plant that will mature between frost and frost. We all know this. It is the case with regard to wheat and the other grains, and the same holds good with apples and other fruits. Only in their case it is more pronounced for not only must the fruit be produced but it must be ripened early enough before the first frost comes in the fall.

This narrows up the problem very considerably, and many a promising tree has had to be discarded because, after years of trial, it was found always to require about another week or ten days to ripen its fruit when the killing frost struck it in the fall. For instance, in 1915, we had 154 new plums fruiting which had never fruited before,

and we expected bushels of ripe plums. That year, we had a killing frost about September 12 and out of all that lot, only four were ripe. All the rest were frozen. It was, of course, a very early frost, but these four trees were ripe on the second of September, ten days before.

Needless to say we look upon these four trees as being more precious than rubies, and on that extra early killing frost as a blessing in disguise, for we know now we have something that will ripen in most years in good time, and what that means to this country, all who are interested in the building up of a contented community will understand and appreciate.

Experiences of this kind are not very encouraging, but fortunately we have men among us who did not mind a little thing like that, and the history of fruit growing on the prairies is very largely the story of the work of a few individual enthusiasts who had a single eye to the one thing.

The Experimental Farms have done good work along certain lines, but if we had not had these other enthusiasts carrying on their own independent experiments in their own way all those years, fruit growing on the prairies would not have been so far advanced as it is to-day.

Mr. John Dixon, of Maple Creek, who is here with us, was one of these enthusiasts and so was his brother Joseph. The late Robert Kells was another Maple Creek man and there have been dozens of others scattered all over the West. The Dixons pioneered in plums and small fruits, and Thomas Clark of Macleod and Mr. McNabb of Lethbridge and some of the Mennonites around Rosthern, in plums. In apples, Dr. Hunt of Indian Head, the late Hon. T. W. Finlay, and W. McKay of Medicine Hat, Messrs Ririe, Mercer, Rasmusson and others of Magrath, Mr. Duce of Cardston, Father Van Tighem and W. H. Fairfield of Lethbridge, Major Campbell, R. G. Mathews, and Joseph Hicks of Macleod, and the late Thomas Daly of Clover Bar, east of Edmonton. These all grew apples ten years ago and more.

The growing of crabs has been fairly evenly distributed from Winnipeg to Edmonton and Calgary so that it may be said that, given the right kind of tree, shelter, soil and ordinary care, there is nothing to hinder most farmers from growing most of the crabs they require in most years. They have been grown successfully in Calgary, which is 3,400 feet above sea-level and at the ranch of that old pioneer, Mr. Joe McFarlane, about ten miles north of Cowley, and only about five or six from the Livingstone range of the Rocky mountains at an altitude of at least 4,000 feet. At these altitudes, the growing season is naturally shorter than most other places and yet crabs have been grown there.

There are doubtless many others throughout the prairies who were successful fruit growers ten to twelve years ago, but these are all known to me personally. I have been to all their places and seen the work they have done and I think it is only right their names should be recorded.

But the two great names of note among fruit growers on the prairies will always be D. W. Buchanan of St. Charles and A. P. Stephenson of Dunston, Manitoba. These two men have done more real original, painstaking, selective work, and for a longer period, than probably all the others put together. Mr. Buchanan's work is not so well known, but most people here will know of A. P. Stephenson, the Apple King of Manitoba. He has practically spent a lifetime in growing the Manitoba apple. It is not given to very many men to see their own monument, but he has his in the apple trees growing in the West. I was down at his place a few years ago, and you may be sure I was very much interested in his place and orchard. But the most impressive thing I saw there was the record he has kept of the different trees he has tried in all these long years. He had tried out some eighty-five varieties of apples alone, and it was most interesting to see the date of planting, where obtained from, and how the tree progressed from season to season till it reached the final record, *dead,* as it almost invariably did. What a monument of patience and perseverance and enthusiasm that book is to be sure. A record of worthy

work, the like of which surely is not to be found anywhere else in Canada. Work that will never be paid for and for which adequate recognition will never be given. He has about a dozen varieties of apples now, which he considers good enough to propagate.

Mr. Buchanan's work has been along the lines of plums, crab apples, cherries, gooseberries, and strawberries. Over thirty years ago, he began selecting native Manitoba plums and raising seedlings from cheney and mankato and now he has some fine fruits indeed to his credit. Of course, they will never be so big as those we get from British Columbia, but they are of good size, good to eat out of hand, make excellent preserves, and most important of all, they will ripen in most years, a week or ten days before the earliest killing frost on record.

The eastern cherry is not a success on the prairie. Nearly every fruit experimenter has tried it, but I have never seen or heard of any success. Even the tree does not live over, and Mr. Buchanan years ago settled down to improve the native Sand cherry or Rocky Mountain cherry, as it is sometimes called. In this he has achieved a notable success, and, from a small puckery, thin-fleshed cherry, he has developed something that is really worth while. The cherry is black, three-quarters of an inch in diameter, fleshy and sweet, with little or no pucker, good to eat out of hand and makes an excellent preserve. It is very prolific and seldom misses a crop. Of course they will not compare with Mr. Johnstone's prize-takers from Nelson, but they will grow on the prairie and are ripe a month before frost, and are, I am sure, destined to form no mean addition to the farmer's household resources in days to come.

The gooseberry is not a brilliant success on the prairie. Downing, Red Jacket, and the Pearl have been successful in some localities, I understand, but Houghton is really the only one we can depend on. But its berries are small and irregular, and so Mr. Buchanan applied himself also to improve it. He has now a fine plant which has larger berries and earlier, more prolific, and more even-sized than the original Houghton. These are all notable achievements in fruit improvement, and Mr. Buchanan deserves very great credit indeed for them.

Bush fruits, red, black, and white currants are hardy practically all over the prairies. Some of the finest red currants I ever saw, and certainly the greatest number I ever saw in this country, were grown by Mr. Joseph Dixon, about fifteen years ago. They were an inspiration to look at and a temptation to get in amongst.

Raspberries are hardy when handled right, notably Sunbeam, Loudon, Turner and King. They have to be buried under soil over winter to get crops, of course. It is easy to do. You just plough two furrows on each side of the row, bend the canes down, and cover them with a shovel. The ground is shaken from them early in spring. Straw will do, but the soil is far the best. Black Rasps are not a success.

Strawberries are being grown more and more every year. Senator Dunlap is the best variety, and the strain that is being planted is mostly from plants introduced by Mr. Fairfield before he was connected with the Experimental Farm, about fifteen years ago. Out of a large number, this was the only one that survived, and it has been so long established that nobody dreams now of its not being hardy. It is usually best to cover the plants with two inches, not more, of straw, just after freeze-up, but the last three years or so we have left ours uncovered and they have come through fine. Other varieties have, of course, been tried, Bederwood, Crescent, and Clyde, for instance, but the Dunlap is the best allround berry. The crop pays too, for from half an acre we planted out last year we netted $62 worth, besides our own using. And so it goes on, the solution of the farmers' home-grown fruit problem. A few men here and there working away in patience and enthusiasm, amid all sorts of discouragements.

By and bye, after the shelter belts are grown, it will be a farmer's own fault if he does not grow most of his own fruit on his own farm. But there is still great room for improvement.

There are just the four ways in which to develop and improve fruits suitable for the prairies. The first is simply the old familiar "survival of the fittest," and is accomplished by trying out quantities of fruit trees obtained from somewhere else, till one or two are found hardy enough to stand the climate and ripen their fruit. This is a long and expensive process which, fortunately, in the case of apples at least, has been solved for us by Mr. Stephenson. The second is, improving our native fruits by selecting the best and sowing the seed, and repeating the process until the desired improvement is obtained. This is also a long and a haphazard process for a very small percentage of such naturally fertilized fruits produces anything better than the parent. The third way is to cross-fertilize artificially, with a view to accomplishing some definite result, such as early maturity or improved quality, or both. This is the way one would look for the most rapid improvement, but little or nothing has been done in this direction in the West. Dr. Saunders has produced some notable improvements on the Siberian crab in this way, but outside of this, and it may be some cross-fertilization of strawberries by Mr. Buchanan, little if anything of value has been done. It is work that takes special training, taste and facilities, and could be undertaken by some of our governments, either Dominion or provincial. Very few private individuals have either the means or the time to devote to work of this nature. The fourth way is, by introducing plants from foreign countries, and in this connection it may be said that almost without exception all the few apples that have proved hardy on the prairie are of Russian origin. More of this kind of work should be done. There are great unexplored horticultural possibilities yet to be discovered in Tibet and the high lands of Central Asia. For instance, a captain with a British expedition into Tibet some years ago found an apricot in cultivation 10,000 feet above sea-level in a dry country with a severe winter much like our own. That plant is now growing in Kew Gardens, England, and I suppose in time will be tried out here, and that is why I said I did not despair of yet seeing peaches or apricots being canned at Maple Creek. This is work for the Dominion. Canada should have two or three horticultural explorers abroad all the time. If any country needs such assistance it is Canada with her rigorous climate and northern situation. We have been too long content to rest on the enterprise of our neighbours to the south of us to solve this sort of problem for us. They can not do it. Our problems are our own, and we should, and can, solve them.

Such is the position of prairie fruit growing to-day. As I said before, much has been done, but much more remains to be done. At the opening of this convention, Mr. Motherwell voiced the key note of the convention when he spoke of, "Continuity of effort in farming." Continuity of effort is right, and if we want to encourage continuity of effort on the part of the farmer, there is no better way than to show him how to provide continuity of contentment and good living for his wife and his children on the farm, and one of the very best ways to do this, indeed, the only way, is to enable him to establish for himself, good, "homey" home-surroundings with plenty of trees for shelter and a good orchard and garden.

The CHAIRMAN: I would like to supplement the remarks of Mr. Mitchell about small fruits. There is a farm south of Grassy Lake in the driest part of southern Alberta where on dry land they have produced all the small fruit, required for the family, including strawberries, raspberries and currants. There is really no reason why if a farmer will devote a small portion of his time to improving farm surroundings, that he cannot grow enough fruit for his family requirements. Probably Mr. Fairfield might like to say something about windbreaks for fruit and the necessity of covering fruit vines.

Mr. FAIRFIELD: In regard to the matter of windbreaks. We find in Lethbridge on the Station, and of course it will apply to all the country usually spoken of as the "Chinook belt," that windbreaks are absolutely essential to the growing of small fruits. The best illustration of the need of this is the fact that on some of our

orchards at the Station, the wind erosion is so great on apple trees some distance from windbreaks that the roots are exposed. On dry land we have to have clean cultivation and as the tree gets larger, the wind would sweep down and get underneath, eating in and taking the soil out from under the branches of the roots and the trees suffer injury in that manner. Another reason is that the more tender stuff require the protection of the trees. Windbreaks are very easy to grow where poplars and willows and Manitoba maples are used in rows. In the Chinook Belt proper, the west is the more important direction to protect from the wind. It is good practice to have it on the north and probably on the south side too, but we find that it is more important to have a windbreak on the west side.

Mr. Mitchell spoke about the covering of strawberries and raspberries. There is one point that stress should be laid upon and that is the mulching of strawberries. Quite often beginners in growing plantations of strawberries are inclined to use barnyard manure to mulch with. In my observation I have found that in four times out of five the manure will kill the strawberries. It seems to pack down too close and smother them. In any event the plants are found to be dead in the spring. They require a looser mulch than barnyard manure. Straw that is found to be free of weed or grass seeds is good, but something looser is even better. The mulch not only protects the crowns of the plants, but also helps to retain moisture. My experience in covering strawberries has been that no covering is of much use except the moist earth. Some years ago we delayed covering the strawberries until quite late in the fall and the ground was frozen and we used frozen soil. It was quite dry and laid in a lumpy condition so that in some places there were not enough air spaces with the result that we found a large number dead or nearly dead in the spring. My idea of raspberries dying is not so much the cold weather, but the cold weather combined with the dry weather. The raspberries do not really die, that is the roots, but the canes, the part of the plant that is fruit bearing is dead and it does not matter to us how long our plants stay alive, if we do not get fruit. Consequently it is important to get the moisture.

Mr. JOHNSTONE: When I arrived in Nelson I was told I could not grow corn and that all sorts of fruit could not be grown there, but being of the same nationality as Mr. Mitchell I was hard-headed and I planted the same sort of garden that I had in Virginia. In a short time I got the same results from my work as were obtained by me in Virginia. I have tried about one hundred varieties of different things without results, but I have got results from many others by trying. I do not think, however, that you will be able to grow the tender varieties of cherries here on account of the climatic conditions, but there is no saying what other fruits can be grown here until a lot of effort has been made.

Mr. BROWN: What would you do with a plum tree that will not bear?

Mr. MITCHELL: I would do as it advises in the good book. "Cut it down."

Mr. BROWN: I bought a place a number of years ago and there were quite a number of different fruit trees there. One was a plum tree and I was told to cut it down as it would not bear. Later I was talking to an old man and he said, "Bore a hole in it and you will get fruit or put a spike through it." So I went home and after I had driven a spike I found it much easier than boring a hole so I drove two or three of them and then drove a row of shingle nails in for good measure. Now it is bearing plums in very fine condition indeed and I have had to prop all the branches up.

Mr. MITCHELL: I was told recently that one way to force fruit was to run a knife down the north side of a tree. I know that you can force fruit. A tree that will bear a full crop this year will not bear so liberally next year. You have to regulate your

orchard so that they will be bearing a good average each year. By pinching back the buds or disturbing the tree you alarm it in other words and it yields, and it will reproduce itself more lavishly in order that it will not die. As a rule it is better to have two or three varieties of plum trees growing together so that cross pollenation will take place as a plum tree is not self-fertile—some of it will not pollenate.

Mr. LINFIELD: Prosperity interferes with production. Alfalfa does not grow seed well. You have to interfere with its growing conditions. An apple tree does not always bear fruit, but it is strong and has a good production of leaves. If you do anything to disturb the tree or check the growth of leaf you will get fruit. That is the explanation of why this gentleman obtained a yield of fruit by boring holes or driving nails in his tree. It disturbed the growing condition. I think the same will apply to a great many things.

Mr. HUCKVALE: The Credentials Committee has to report that there are 158 delegates, which includes 24 visiting delegates.

The CHAIRMAN: In the matter of the next place of meeting, the secretary has some communications to read.

The SECRETARY: Before Mr. Biker left he handed me a message to read to this convention. He says:—

I am here at this convention representing the Hon. T. D. Patullo, Minister of Lands of British Columbia, also Mr. D. Young, Comptroller of Water Rights, and to present to you their sincere regrets at not being able to be with you. Some of you in this room will remember previous conventions held at Kelowna, Penticton and Kamloops, and will remember the very complicated problems arising at those meetings which are still before our department for solution. It may be of interest to state that the chief reason for Mr. Patullo's absence to-day is caused by the very dry spell we have experienced of late in British Columbia, making the irrigation problem there very acute and he and Mr. Young are now on a tour holding meetings daily with the water users in order that the present Government can decide on the best policy to pursue in the matter.

It may appear on the first blush that this question has been held over too long, but I hasten to assure you that since the convention at Vernon our department has (and even before that date) continued field and office investigations, with the result that within a very short time a policy will be enunciated which has for its object the protection of the water user, or the man on the land.

I give you my Minister's best wishes for a successful convention coupled with the hope that he may meet you at Nelson in 1918, when he will give you in person many details of the very intricate problems British Columbia has to face.

I have also a letter from the Nelson Board of Trade inviting this association to hold its next convention at Nelson, B.C.

After discussion, it was moved by Mr. Huckvale, seconded by Mr. Dixon, that this association hold their next annual convention at the city of Nelson.

Carried unanimously.

Mr. DIXON, on behalf of the Nominating Committee appointed by the President, we submit our report.

The SECRETARY: In addition to the usual report, it is the opinion of the committee that the present Governor General should become a patron of the association, particularly as it is well known that he is himself an agriculturist and an official very much interested in agriculture in this country.

The following is the list of recommendations:—

Honorary President, Minister of the Interior, Ottawa.

First Honorary Vice-President, the Minister of Agriculture, province of Alberta.

Second Honorary Vice-President, the Minister of Agriculture, province of Saskatchewan.

President, the Minister of Lands, British Columbia.

First Vice-President, Honourable Hewitt Bostock.

Second Vice-President, Mr. G. R. Marnoch.

Executive: Mr. R. G. Williamson, Maple Creek, Sask.; Mr. James L. Brown, Kamloops, B.C.; Mr. A. S. Dawson, Calgary, Alta.; Mr. James Johnstone, Nelson, B.C.; Mr. F. H. Peters, Calgary; Mr. W. E. Scott, Victoria, B.C.; Mr. F. H. Auld, Regina, Sask.; Mr. F. R. E. Wollaston, Vernon, B.C.

The report was adopted.

The CHAIRMAN: We will now have an address from Mr. A. A. Dowell.

Mr. DOWELL: I consider it a privilege to be asked to address this convention on the subject of "Sheep in Western Canada." There was a time when a speaker had to resort to a fund of jokes and stories to interest his hearers in the subject of sheep. Not so to-day. With present prices for wool and mutton, the raising of sheep is being more carefully studied than ever before. From recent market reports I find that females of all ages are being eagerly sought for breeding purposes. And rightly so, for any animal that can produce both food and clothing for our families, and do so at a reasonable profit, is assured of a permanent place in our system of agriculture. Five years hence they will be found on far more farms than they are to-day.

The raising of sheep fits in well with any system of mixed farming—a thing which every Canadian farmer must resort to sooner or later, in order to maintain the high production of his fields. In any new country, the first system practised is mining the soil by the growing of grains. The decreased fertility and incoming weeds make the producing of live stock imperative. A wiser plan would be to combine the two at the outset.

It will be interesting to note some of the advantages of sheep production. A small band of breeding ewes can be purchased with much less capital than any other farm live stock. They insure a steady income through the sale of wool and lambs. They will eat over 90 per cent of our farm weeds and can be used to advantage in clearing bushy land. Weed seeds are entirely destroyed during digestion. Excellent results can be obtained without the expense of elaborate buildings. Much feed is utilized that would otherwise go to waste, in the stubble field, along lanes, fences and the like. Sheep make cheaper gains than cattle, though perhaps not equal to the pig in this respect. They consume relatively smaller amounts of water, which is quite an item in the dry sections, particularly during the winter months. Incidentally sheep bed down at night on the higher, thinner land which is enriched by the droppings. Then, too, the housewife is furnished with excellent meat in carcasses of convenient size.

Any one who is seriously considering the purchase of a small flock of ewes, should be aware of the difficulties which will sooner or later confront him. In the first place, sheep men are born, not made. One must like sheep to make a success of the undertaking. Then there are the losses due to dogs, coyotes and wolves. Such losses have driven many breeders out of business. This can be avoided on the range by having a shepherd constantly with the flocks. The small farmer will find the best insurance in suitable fencing.

In the early development of the country, sheep were raised largely for wool. With the increasing demand for meat, more attention was given to combining a mutton

form along with a reasonable fleece. At this time, the beginner will find three distinct types from which he can make his selections—fine wools, represented by the American Merino, Delaine Merino and Rambouilet; medium wools, chief among which are the Shropshires, Hampshires, Oxfords, Southdowns, Suffolks, Cheviots and Dorset Horns; and long wools, as found in the Lincoln, Cotswold and Leicester breeds.

The fine wools are more or less covered with wrinkles and are grown chiefly for the extremely fine wool, while the latter two types are grown for both mutton and wool. Under range conditions in Western Canada, the long wools are often objected to because of the open fleece which holds the rain and snow, and results in colds. Fine wool breeds lack mutton form and also suffer from the severe winters. In point of numbers, the medium wool breeds are far more popular in this country. Range men prefer some Merino blood in their sheep, however, as it insures a dense fleece and preserves the flocking instinct.

It will be well for the beginner to start with a small flock of grade ewes. This flock will increase in numbers along with the owner's experience. A few purebred ewes may be added later, and with the knowledge gained through handling the grade flocks, success will be assured. In selecting the ewes, each one would be examined as to mouth and udder. Spoiled udders mean certain trouble at the lambing time. "Broken mouths," by which is meant ewes of advanced age—shown by massing teeth—must be avoided. Incisor teeth, eight in number, appear in the lower jaw only. The lamb will have eight small teeth. At one year of age or shortly following, the centre pair will be replaced by a pair of large mature teeth. At two years, one tooth on each side of the centre pair will appear. The three-year-old will have six permanent teeth, with the corners coming up at the fourth year, when a full mouth is shown. By this time, the teeth begin to space and grow narrow. Then they begin to fall out, by which is meant the "broken mouth," and warns one of advanced age and loss of grazing powers. Ewes begin to decline at around five years of age, though with special care, are often productive up to ten years or more.

A word of caution might well be added here. With the present high prices for grain and the short crops in many sections, there will be a tendency to sell many ewes that should be retained for breeding purposes. One needs only to remember that there is a world shortage of both mutton and wool and that, in 1915, Canada had only 2,038,662 sheep on hand.

Next comes the question of just how to proceed to improve the foundation flock. This can be done only by using good pure-bred rams, as shown by an experiment carried on at the Missouri Station in 1911-12. A band of common western ewes were purchased, half of which were bred to a scrub western ram, and the balance to a pure-bred Hampshire. The difference in gains of the two groups of lambs was not as great as might be expected, but the chief difference came at marketing. Under identical conditions of feed and care, the lambs by the scrub ram sold in the St. Louis market for $4.50 per cut, while the lambs by the pure-bred sire sold for $7.35. No doubt several buyers could be found at that figure to-day.

Under range conditions, a yearling ram should not be given more than 30 ewes, with 40 as the limit for the mature ram. Where "hand coupling" is practised, a yearling ram can handle 50 ewes during the season, with as high as 75 to 90 in mature form. A ram lamb should not be turned with ewes on the range. Under farm conditions he may be mated to 1 to 20 ewes without checking his growth or imparing his future usefulness.

The proper time for breeding depends upon the facilities for handling the ewes at lambing time. Pregnancy period for ewes is 146 to 147 days. Show lambs must necessarily be dropped early, which necessitates warm housing and careful attention. May or even early June lambs will be more satisfactory for those with insufficient help and limited building space.

All rams should be separated from the ewes before cool weather begins in the fall, for ewes will begin to show signs of mating at that time. Then about three

weeks before the breeding season comes the "flushing period." This means increasing the feed so that the flock will be gaining in flesh at the time of service. "Flushing" results in all ewes coming in heat at more nearly the same time, so that the lambs can be marketed at about the same age and weight. Rape pasture is excellent for this purpose, though roots, bran, oats and the like may be used with good results.

Too close confinement during pregnancy, even with the best of feed, leads to weak, flabby lambs. Plenty of exercise with protection from the winds and snow, along with suitable feed and water is necessary to insure a strong, vigorous lamb crop. Alfalfa hay has no superior as a roughage. In fact, if this is available, no grain is needed up to within three weeks of lambing time, when a little oats should be added. Where alfalfa is not available, prairie hay and whole oats will give excellent results. Timothy hay is not a sheep feed and should not be used if it can be avoided. Every precaution should be taken to keep the ewes in the pink of condition—neither too fat nor too thin. Fat ewes produce the weak, flabby lambs, while those in an emaciated condition are often unable to deliver their lambs. Water and salt should be available at all times. The common practice of forcing sheep to eat snow should be discouraged. Sheep require but little water—from one to six quarts per day—but that little is needed.

For March and April lambing, each ewe should be placed by herself at the expected time. When running with the flocks the new-born lambs are often tramped to death, or in case of twins or triplets become separated from the ewe so that but one will be claimed by its mother. Ewes recognize their offspring by sound and scent only. Little difficulty of this kind is encountered where the lambs are dropped in the open. At the time of lambing, heavy wooled ewes should be "tagged" so the lamb will find easy access to the udder. Time will not permit discussing the care of weak or unclaimed lambs.

Shepherds prefer to have all shearing over either before or soon after lambing, for, regardless of the season, such work cannot be carried on at that time. For late lambing, shearing is often done prior to that time, though ordinarily it comes later. Such work should be done after the chilly spring days are over and shortly after the warm sunny days have started the yolk. For this district late May or early June will be the proper time for shearing. If allowed to run too long, there will be considerable loss of wool besides the unnecessary discomfort to the flock. Power shears are preferred to hand work, as a much neater job results along with a trifle more wool. Experiments show a saving of four ounces of wool per sheep, which is well worth considering when, at present prices, two and one-half ounces of wool will pay for the shearing.

Docking is not practised simply to add to the appearance of the sheep as some seem to believe. It prevents the collection of filth at the rump with the attendant loss from maggots. Incidentally, it also adds to the market price. This should be done when the lamb is from seven to eleven days old, either with a sharp knife or hot iron. The hot iron is to be preferred as it prevents the usual loss of blood. Male lambs intended for market should be castrated about one week after docking. If these two operations are performed at an early age the shrinkage is much less than if allowed to run until more mature. Under range conditions lambs are usually docked and castrated at the same time, even though the shrinkage is usually quite heavy and an average loss of one per cent.

The entire flock should be dipped at least twice a year, and preferably twice—immediately after shearing and then again when brought into winter quarters. Any prepared sheep dip or coal tar preparation will give good results. Lice and ticks which are responsible for many an unthrifty flock could be entirely avoided at little expense in time and money.

Lambs will begin to eat grain at two to three weeks of age. The small farmer will find it very profitable to provide the youngsters with a creep where they can have access to crushed oats and bran for the first two months, and then whole oats up to marketing. Well grown lambs should average 80 pounds at four months.

Range men usually figure a ninety per cent increase in the flock as very satisfactory. Under farm conditions, this can be raised to 120 per cent and often much higher. I remember of one flock of 100 ewes with an increase of 165 per cent, a record well worth striving for.

Fall rye will be found an excellent early spring pasture. This may be followed with oats and peas, and rape later in the season. One will be surprised how many sheep can be handled in a limited area, where attention is given to suitable pasture crops.

Lambs should be weaned at four months, so that the ewes will have to prepare for the coming season. Care must be taken to prevent spoiled udders in the heavily milking ewes. The best ewe lamb should be retained in the flocks and the plainer ones marketed with the wethers. By using good rams each year, it is only a question of time until the original grade ewes will be replaced with the thick early maturing sort, so much in demand.

Every sheepman should make himself thoroughly acquainted with the more common sheep troubles and diseases. I will not have time to go into that phase of the subject, but in closing, wish to say something about the care of wool.

Wool is now sold on a quality basis, so that the man producing clean, sound wool is paid accordingly. As ever, money speaks louder than words, so we can expect a marked improvement in the quality of the wool in the near future. Wool twine should be used in tying the fleece—binder twine, wire and the like, never. Any foreign material such as binder twine, timothy heads, burrs, tags, tatoo paints and dirt, not only make the scouring process much more difficult, but often result in an inferior grade of clothing. Keep the fleece as clean as possible, fold it up with the inside out, tie with wool twine, and place in the large wool sacks made for the purpose. I believe I have already exceeded the time allotted. It is always a privilege to me, to appear as a champion of more and better live stock. I thank you for your patient hearing.

The CHAIRMAN: I think Mr. Dowell is a very decided acquisition to the sheep industry of Alberta, and I am sure we all appreciate very much his address.

I would like to suggest to the executive of this association that they should follow up the feeding of the products from the irrigation farms to sheep. I think also the farmer on a quarter or a half-section should do something more in the sheep-producing line. The eternal pork and bacon that is served up on the farm is very monotonous indeed. It should be varied by mutton from time to time. Mutton is an exceedingly palatable food and the small carcass is easily taken care of. More so, I should think, than the bigger carcasses of pork.

I will now call upon Prof. F. B. Linfield, Director Montana Agricultural Experimental Station, Bozeman, Montana, to address us on "Sweet Clover."

Prof. LINFIELD: In the development of a new agricultural country our first problem is to determine what varieties of crops are best adapted to the country and what methods of soil and crop management will enable these crops to yield their best. In our northern country this pioneer farming is almost altogether a production of cereal crops—wheat, oats or barley, and flax. In a few years, however, we find that the reduction in fertility and the introduction and multiplication of weeds, makes continued grain growing less and less profitable. A permanent agriculture demands a different system of farming and the sooner the new settler can get started on a permanent basis the better for himself and for the country.

Our studies of the old and permanent system of agriculture show that they produce three types of crops from the soil—

(1) Cash crops: such as cereals and other grains.

(2) Soil enriching crops: clovers, alfalfa, hay and corn.

(3) Soil cleaning crops: corn, potatoes, field roots and other cultivated crops.

If all these crops are to be fully utilized upon the farm, live stock of course must be kept as some of the grains, all of the hays and much of the soil-cleaning crops can find profitable use only as food for live stock. It is, I presume, out of your need for a suitable soil enriching crop that you have asked me to discuss with you the use of sweet clover.

Now I do not want to present sweet clover as a competitor with alfalfa, which has been so well and ably discussed at this meeting. When alfalfa does well, as I notice it does under irrigation at Lethbridge, I would use alfalfa, unless you wanted a shorter rotation than alfalfa fits into. My first experience with sweet clover was in the state of Utah some twenty-three years ago. The white variety was very common in waste places and along the roads, growing sometimes as high as a man on horseback. While not growing as tall this plant is also found all over Montana. Its vigour of growth under a great variety of conditions, and the success which a few farmers were having with the crop both as pasture and as hay, has led the Montana Experiment Station to undertake some definite experiments with the plant. Our tests have not been continued long enough to warrant further conclusions than that the plant is a good yielder and that, whether as pasture or hay, stock do well upon it when they learn to eat it.

To know the value of any plant we must know something of its characteristics and its comparative worth as compared with other crops grown in the same locality. There are many varieties of sweet clover, but only two are common in our northern country—The white-flowered (Melilotus alba), and the yellow-flowered (Melilotus officinalis). Both are biennial plants. The white is the larger and stronger growing variety but our results do not show much difference in yield. Each has its advocates, but further experiment is necessary to determine positively their relative value. A study of the characteristics of this plant shows its wonderful adaptability to a great variety of conditions. It is a very vigorous and rapid grower, attaining a height of five to ten feet. Extreme of heat or cold does not seem to affect the plant. It grows well in the extreme south, and all the way between, up to and including Montana, where it grows well in nearly every part of the state. It can withstand very great extremes of wet and dry soil. It will grow on stronger alkali soil than any other farm crop. In fact, it has considerable renovating power when grown on such soils, in preparation for other crops, particularly alfalfa. It will also grow better on very poor soils than any other leguminous plant, but to do its best such soils should be rich in lime, and may have to be inoculated.

A peculiarity of this plant is that it needs a very firm seed bed. It will even start on hard compact soil if moisture is available. It does not germinate readily or grow well on lose open soils. Sweet clover is a strong nitrogen gatherer, the roots being loaded with nodules, even on poor soil. It is thus a great soil enricher. Some soils need inoculation, but this is not commonly the case in Montana. If it should be necessary, the same method should be followed as for inoculation for alfalfa.

As the plant is a biennial, it does not grow very high the first year but stores up a large food supply in its fleshy roots. The second season it develops to its full height and if permitted to do so, matures a heavy crop of seed. At the end of the second season the plant dies; the roots thus adding much humus to the soil.

As a rule the seeds are slow to germinate as there are many hard coated seeds. Probably not more than half the seeds will germinate the first season. This means a little thicker seeding than for alfalfa—say 15 to 20 pounds per acre. In the drier sections of the country on the dry lands, the crop may be seeded in rows 12 to 24 inches apart, when 4 to 6 pounds of seed per acre will be plenty.

Sweet clover produces a very fine quality of honey and as it flowers profusely and continually through the season it provides a large quantity of honey for the honey-bee, and in some parts of the country has been seeded in waste places by the bee-keepers to provide a honey crop. It is valuable as a fodder crop only in its early stages of growth, as after it is in full bloom it gets very woody and the leaves fall.

The crop should be seeded in the spring on a firm seed bed. Fall-ploughed land or land that has had a cultivated crop the year before is to be preferred. Spring-ploughed land should be very firmly packed before seeding to sweet clover. A nurse crop if seeded rather thinly, may be used particularly if planted in rows. On the dry farm, however, it is preferable to plant without a grain crop, and when seeded broadcast, considerable feed will then be obtained the year of seeding. Probably the greatest value of the sweet clover is as pasture. It should have a good start in the spring, and then enough stock kept on the field to prevent it from gaining on them. If it should get ahead of the stock the crop should be mowed down. The plant is an early grower in the spring so that it will make one of the earliest pastures. Another advantage is that it very seldom bloats stock, whereas there is always more or less danger with alfalfa. All classes of live stock do well on sweet clover pasture but hogs especially so.

When used for hay, cut the crops when the first few blooms appear. It should be cut about four or five inches above the ground, as unlike alfalfa the second crop grows from low branches and not from the crown. Thus if the crop is cut so close to the ground as to remove the branches the next crop is very much reduced. In the moister parts of the West the first crop may be cut for hay and the second left for seed. At the present time there is good money in the seed crop. For seed the crop may be cut with a binder. The seed however, drops off readily, so that it is advisable to put pans under the binder, one where the table and elevator canvases join and the other under the knotter. These will catch the larger proportion of the seed thrashed out by the binder. As sweet clover is a biennial plant provision should be made so that it re-seeds itself. If pastured or cut too close, no seed will be formed so the plant will disappear after the second year. Sweet clover is such a vigorous grower that to many farmers it appears to be a weed. However, it seems to grow mainly in waste places only and does not usually trouble the cultivated fields. When growing along irrigated ditches the seed is frequently carried into cultivated fields. This is not usually objectionable, however, except for alfalfa fields kept for seed.

Sweet clover is not readily eaten by stock, because of its bitter taste. Usually, however, once they have learned to eat it they seem to relish the sweet clover as well as they do alfalfa. As sweet clover is one of the earliest growing plants in the spring, stock turned on this crop as early pasture generally soon learn to eat it. Sometimes the stock have to be starved to the fodder by confining them to sweet clover alone. Salting the sweet clover hay will usually encourage the stock to eat it without any difficulty. After the animals acquire the taste for the crop they do as well upon it as upon any other fodder. The chemical composition of the plant is very similar to that of alfalfa. Some of our analyses indicate that it is even richer in protein than alfalfa. It is, therefore, when cut at the proper stage, a strongly nitrogenous food and may be used with advantage with more carbonaceous fodders. Compared with alfalfa, sweet clover is a stronger grower, and a much larger plant. It is richer also in protein, when cut in early bloom which is the best time for making hay. Is it not to be recommended as taking the place of alfalfa or red clover where these do well. Sweet clover has a greater range of adaptability than alfalfa, and will grow on soils too damp and too alkaline for the successful growth of alfalfa. It is sometimes used as a preparatory crop for alfalfa particularly on alkali and heavy soils. It appears also to require the same type of bacteria for inoculation as alfalfa, thus serves in this way as a preparatory for the alfalfa crop.

As sweet clover is a biennial, it fits well into a short rotation as a soil enriching crop, in this again having some advantage over the alfalfa, which fits to advantage only into a long rotation.

To those who would like to read up more fully on sweet clover I would refer them to the following publications:—

Sweet Clover: Growing the Crop. Farmers' Bulletin No. 797, U. S. Department of Agriculture.

Sweet Clover: Utilization. Farmers' Bulletin No. 820, U. S. Department of Agriculture.

Sweet Clover: Harvesting and Thrashing the Seed Crop. Farmers' Bulletin No. 836, U. S. Department of Agriculture, Washington, D.C.

Sweet Clover: International Harvester Company, Chicago, Ill.

Forage Crops for the Colorado Plains. Colorado Station, Bulletin 214 (1915). (Includes directions for growing sweet clover.)

Aberdeen Sub-station. Idaho Station Bulletin 84 (1915). Promising results reported with sweet clover.

Irrigated Agriculture in the San Luis Valley. Colorado Station Bulletin 209. (Suggestions for the production of sweet clover.)

Report of the Agronomist. Wyoming Station Report, 1915. (Germination of sweet clover seed.)

Monthly Bulletin of Western Washington Sub-station, vol. 1, No. 3. (Alfalfa in Western Washington and sweet clover.)

Silage and Grain for Steers. South Dakota Station Bulletin 160 (1915). (Analyses of sweet clover hay.)

Journal, Amer. Soc. Agron., 7 (1915), No. 4. (The effect of different methods of inoculation on the yield and protein content of alfalfa and sweet clover.)

Forage Crops. Wyoming Station Bulletin 104 (1914). (Sweet clover makes a good crop where alfalfa cannot be grown.)

Sweet Clover. Michigan Station, Circular 23 (1914).

Report of work on Sub-station Farms. Oregon Station Bulletin 119 (1914). (Cropping methods discussed include sweet clover.)

Trials with Sweet Clover as a field crop in South Dakota. South Dakota Station Bulletin 151 (1914).

Minor Dry Land Crops at the Nephi Experimental Farm. Utah Station, Bulletin 132. (Sweet clover noted as of little value under these conditions.)

Green manuring and cover crops. Mass. Station, Circular 37 (1914). (Sweet Clover.)

Forage crops in Central Washington. Washington Station Bulletin 128 (1916). (Brief notes on results of trials including sweet clover.)

Work with Field Crops. North Dakota Station, Report Dickinson Sub-station (1913). (Cultural tests with sweet clover.)

Work with Field Crops. Minnesota Station, Report 1915. (Experiments pointed out the value of inoculation and liming.)

Sweet Clover. Wyoming Station, Bulletin 110 (1916).

Sweet Clover, Circular No. 62, Montana Experimental Station, Bozeman, Mont.

Mr. BARK: Do you have to leave some growth on the first season?

Prof. LINFIELD: We have not had any trouble in that way. Last year was the most severe winter we have had and it has come through much better than our alfalfa did. The yellow flowering kind came through better than the white. We have a 95 per cent stand this spring.

Mr. BARK: Was it mowed down last fall?

Prof. LINFIELD: No, we do not mow it close down. Even the second cutting is left high. Stock will eat this very well if it is run through the cutting machine.

Prof. FAIRFIELD: When making two cuttings of clover on the irrigated land was there any difference in the fineness of the plant?

Prof. LINFIELD: I cannot answer that because in the reports I get about our growing of it I found no comment, so I do not believe there could be any contrast. On the piece I noticed myself I found no particular difference.

Mr. PORTER: How does it compare in the cost of seeding?

Prof. LINFIELD: Just now it is costing more than alfalfa owing to the fact that there is not much seed to be had down there.

CHAIRMAN: We will now have the Chairman of the Resolution Committee submit the resolutions of the association.

1. Resolved by the Western Canada Irrigation Association in convention assembled,—

That the governments of the Empire should accept the sole responsibility of the settlement and future welfare of the Empire's sailors and soldiers, together with their dependents.

And that the Western Canada Irrigation Association pledges itself to do all in its power, individually and collectively, to assist in the settlement of returned service men.

And that a copy of this resolution be forwarded to His Excellency the Duke of Devonshire and to Mr. Herbert Easton, Honorary Secretary, British Immigration League.

2. Whereas the limitations of irrigation are determined by the amount and regularity of stream flow, and the latter are to a great extent dependent upon the presence of forests in the watershed; and

Whereas protection and development of the forests serves the dual purpose of conserving the timber and the water supply; and

Whereas the members of the Cypress Hills Water Users' Association are almost entirely dependent for water for irrigation purposes on streams rising in and flowing from the Cypress Hills Forest Reserve;

Therefore be it resolved by the Western Canada Irrigation Association in convention assembled to request the Honourable Minister of the Interior to make inquiries as to the steps which may be necessary to inaugurate a definite and substantial policy, the effect of which would be to re-establish as soon as may be possible the forest cover in the Cypress Hills Forest Reserve.

Whereas an accurate knowledge of the location, quality and quantity of water supply available is the basis of irrigation development, and

Whereas the matter of topographic and hydrometric surveys to determine the location and quantity of such water supply and the proper methods of conserving it must be undertaken by the Government administering the law relating to the use of such water, and

Whereas it is understood that the Governments concerned find it necessary to curtail expenses as much as possible, and whereas it would be a great misfortune if the work already started should be interrupted, as records missed cannot be recovered,

Therefore be it resolved that this convention urges strongly upon the Dominion Government and the Government of the province of British Columbia, the importance of making the necessary appropriation and providing the necessary staff to continue, without interruption, the work of gauging all streams of water supply.

That the Western Canada Irrigation Association is in accord generally with the endeavours of the recent conference at Lethbridge on more and better water for our farmers, and is in harmony with the general principles of the resolutions passed at the conference.

That the Western Canada Irrigation Association desires to invite the attention of the Public Health Departments of British Columbia, Alberta and Saskatchewan to the necessity for generally advising on and supervising the waters in irrigation ditches to prevent pollution, in the general interests of the public health, with particular reference to the matter of the location of barnyards, etc., the drainage from which finds its way into ditches, the water from which is often the sole source of domestic water supply.

Resolved that this association endorse the principle of encouraging more interprovincial co-operation in the consumption of home products;

Therefore be it resolved that the members of this association use every effort to encourage the consumption of such products.

Thanks were also tendered to the speakers: to the mayor, officials and citizens of Maple Creek for courtesies extended to the management of the local stampede, to the press, to the members of the Cypress Hills Water Users' Association, and to the Minister of the Interior for printing the report of the convention.

Mr. PEARCE: I think we should pass a resolution thanking the Department of the Interior, and of which department Mr. Drake here is the representative, for their very kind support in publishing the annual report of this association.

Mr. DRAKE: I think I can promise you on behalf of the Minister that notwithstanding the greater economy practised at this time, and also the cost of printing, the department will again take the responsibility for the publishing of this report. It has given us great pleasure personally to read over the proceedings of this association and I may say that we have watched with great interest the splendid growth of this association from year to year.

The CHAIRMAN: The convention will now stand adjourned *sine die*.

DELEGATES ATTENDING MAPLE CREEK CONVENTION.

W. R. Abbott, Geo. A. Adams, Maple Creek; Mayor Annabel, Nelson, B.C.; C. Anderson, A. O. Anderson, Maple Creek; Wm. Argue, Golden Prairie, Sask.; J. G. Armstrong, C. M. Armstrong, T. C. Armstrong, Maple Creek; E. M. Arnold, Canadian Society of Civil Engineers, Calgary; F. H. Auld, Deputy Minister of Agriculture, Regina; John Badhen, Maple Creek; Don. H. Bark, Chief of Irrigation Investigations Division, Canadian Pacific Railway, Strathmore, Alta.; C. W. Baker, Assistant Secretary, W.C.I.A., Calgary; E. A. Bell, Alderman, Medicine Hat; Thos. Berle, Robsart, Sask.; W. J. E. Biker, Department of Lands, British Columbia, Nelson, B.C.; Prof. J. Bracken, University of Saskatchewan, Saskatoon; F. D. Brown, Coulee, Sask.; J. L. Brown, Kamloops, B.C.; R. J. Burley, Canadian Society of Civil Engineers, Ottawa; W. A. Burton, Medicine Hat; B. Cheeseman, Maple Creek; P. Chevalier, Mayor of Maple Creek, Maple Creek; H. A. Colquhoun, Maple Creek; Robt. Clark, Alfred Clark, Consul, Sask.; J. W. Colquhoun, Maple Creek; Geo. H. Coulter,

Piapot, Sask.; Frank Cross, East End, Sask.; S. Cruikshank, Mayor of Medicine Hat; Mrs. A. Cumberland, Miss Cumberland, A. Cumberland, W. H. Curley, Rev. T. J. Davies, Maple Creek; A. S. Dawson, Chief Engineer, Department of Natural Resources, Canadian Pacific Railway, Calgary; D. B. Detwiler, John Dixon, W. B. Dixon, D. C. Dixon, Jos. Dixon, W. Dobbin, Maple Creek; A. A. Dowell, Professor of Animal Industry, University of Alberta, Edmonton South; E. F. Drake, Superintendent of Irrigation, Ottawa; J. K. Edwards, Maple Creek; M. Elliott, Cross, Sask.; E. E. Eisenhauer, Swift Current, Sask.; Prof. W. H. Fairfield, Supt. Dominion Experimental Farm, Lethbridge, Alta.; E. J. Ferroby, Wm. Ferraby, Maple Creek; E. J. Fewangs, Medicine Hat; E. H. Finlayson, District Inspector of Forest Reserves, Calgary; M. M. Fleming, E. A. Frederick, Maple Creek, Saskatchewan; M. H. French, C.S.C.E., Calgary; W. R. Fulton, Walsh, Alta.; A. Fontaine, Gravelbourg, Sask.; M. D. Geddes, Farm and Ranch Review, Calgary; H. Gelmer, Pasqua; Herbert Gold, F. F. Grage, M. S. Grey, G. R. Hammond, John Hansen, Maple Creek; Mrs. T. A. Hargrave, T. A. Hargrave, Walsh, Alta.; Edward Harrison, Amelia P.O., Sask.; G. S. Herringer, Manager Merchants Bank of Canada, Maple Creek; D. G. Hewitt, R. S. Hodson, Maple Creek; D. B. Howell, Yorkton; Walter Huckvale, Medicine Hat; J. E. Ingram, J. H. Jamieson, Maple Creek; Albert Johnson, Krupp, Sask.; Jas. Johnstone, Nelson, B.C.; Joseph Kisell, Nashlyn, Sask.; Prof. L. S. Klinck, Dean of Faculty of Agriculture, University of British Columbia, Victoria, B.C.; Olaf Kobberstad, Krupp, Sask.; Thomas Kokott, East End, Sask.; W. F. Lawrence, Maple Creek; J. M. Leamy, Canadian Society of Civil Engineers, Winnipeg; H. Le Pargeneux, Maple Creek; F. B. Linfield, Director, Montana School of Agriculture, Bozeman, Montana; S. H. Linney, Medicine Hat, Alta.; Jas. Little, A. E. Littlejohn, Maple Creek; F. M. Logan, Assistant Dairy Commissioner, Regina; W. J. Lyman, T. McBrien, Maple Creek; W. T. McDonald, Department of Agriculture, Victoria, B.C.; Jas. McGarry, Coulee, Sask.; Hugo. Maguire, Maple Creek; A. D. McKinnon, Battleford; Mrs. Jas. McKinnon, Jas. McKinnon, Vidora, Sask.; Mrs. McMurtry, Moosejaw; F. D. McNaughton, Canadian Pacific Railway, Brooks, Alta.; O. E. Maddsson, Golden Prairie, Sask.; G. R. Marnoch, President of Board of Trade, Lethbridge; Jas. R. Marshall, Alderman, Medicine Hat; W. M. Martin, Premier of Saskatchewan, Regina; O. W. Martyn, Canadian Society of Civil Engineers, Swift Current; Mr. Mabee, Department of Natural Resources, Canadian Pacific Railway, Calgary, Alta.; W. T. Mee, A. A. Meneley, Maple Creek; A. W. Mitchell, Mitchell Nurseries, Limited, Coaldale, Alta.; A. M. Moody, Klintonel P.O., Sask.; Wm. Moore, Carmichael, Sask.; H. Moorhead, Piapot, Sask.; F. W. Morrison, Royal Northwest Mounted Police, Maple Creek; G. A. Morrison, Official Reporter, Calgary; Hon. W. R. Motherwell, Minister of Agriculture, Regina; Mrs. Robert Needham, Robert Needham, H. Needham, Piapot, Sask.; J. McD. Palton, Regina; W. G. Patterson, Battle Creek; John Patterson, Maple Creek; Edward Paulson, Robsart; Wm. Pearce, Statistician, Department of Natural Resources, Canadian Pacific Railway, Calgary; F. H. Peters, Commissioner of Irrigation, Department of the Interior, Calgary; F. A. Peterson, J. T. Pickett, C. E. Pinder, Maple Creek; S. G. Porter, Canadian Society of Civil Engineers, Calgary; G. W. Quick, Mrs. G. Quick, Maple Creek; H. W. Rawley, Vidora, Sask.; Jas. Reid, F. B. Richardson, Maple Creek; Mrs. S. J. Richardson, Councillor, Saskatchewan; L. E. Richardson, Councillor, Saskatchewan; Walter Ricks, Calgary; G. E. Salisbury, T. J. Shearer, S. Smiley, F. J. Smith, Maple Creek; E. A. Smith, Experimental Farm, Ottawa; B. F. Snow, Cardell, Sask.; R. J. C. Stead, Calgary; J. W. Stearns, Dollard, Sask.; G. C. Stewart, Maple Creek; Isaac Stirling, Nashlyn, Sask.; C. H. Stockdale, Maple Creek; R. S. Stockton, Superintendent of Operation and Maintenance, Canadian Pacific Railway, Strathmore, Alta.; J. S. Tempest, Canadian Society of Civil Engineers, Calgary; I. Triplett, Gerald Udal, Maple Creek; S. Unsworth, Piapot, Sask.; Rev. J. G. Vitson, Maple Creek; Geo. Watson, Whiteman, Sask.; I. H. Williams, R. G. Williamson, Maple Creek; D. Wood, Coulee, Sask.; A. Woodburn, G. Woodburn, Robt. W. Woodburn, Jacob Wysong, Maple Creek.

LIST OF PUBLICATIONS OF THE IRRIGATION BRANCH.

Annual Stream Measurements Report, 1909 to 1915.

Irrigation Report, 1906 to 1915.

Irrigation Surveys and Inspections Report, 1915; (1915-16); (1916-17).

Western Canada Irrigation Association Report (1st to 10th Convention).

International Irrigation Congress Report (1914).

Bulletin No. 1 (Irrigation in Saskatchewan and Alberta).

Bulletin No. 2 (Alfalfa Culture).

Bulletin No. 3 (Climatic and Soil Conditions, C.P.R. Irr. Block).

Bulletin No. 4 (Duty of Water Experiments and Farm Demonstration Work).

PAMPHLETS:

Address by Mr. S. G. Porter; "Practical Operation of Irrigation Works"; Extract from W.C.I.A. Report, 1914.

" " Dr. Rutherford: "Inter-dependence of Farm and City"; Extract from W.C.I.A. Report, 1914.

" " Mr. Don. H. Bark: "The Actual Problem that Confronts the Irrigator"; Extract from W.C.I.A. Report, 1914.

" " Mr. Don. H. Bark: "Practical Irrigation Hints for Alberta"; Extract from W.C.I.A. Report, 1915.

" " Mr. Don. H. Bark: "Alfalfa Growing"; Extract from W.C.I.A. Report, 1915.

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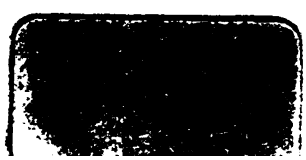

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